

RETURN WITH BID

LETTING DATE April 25, 2008

ITEM NUMBER 3A

Proposal Submitted By

Name _____

Address _____

City/State _____

9 Digit Zip Code _____ Telephone Number _____

FEIN Number _____ FAX Number _____

E-Mail Address _____

BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL
(See instructions inside front cover)

NOTICE TO PROSPECTIVE BIDDERS

This proposal can be used for bidding purposes by only those companies that request and receive written AUTHORIZATION TO BID from IDOT's Central Bureau of Construction.
(SEE INSTRUCTIONS ON THE INSIDE OF COVER)

PROPOSAL COVER SHEET



Illinois Department of Transportation
DIVISION OF AERONAUTICS

AIRPORT Chicago Rockford International

MUNICIPAL DESIGNATION Rockford

COUNTY DESIGNATION Winnebago

ILLINOIS PROJECT NO. RFD-3787

FEDERAL PROJECT NO. 3-17-0088-XX

Is the Option for Bituminous Materials Cost Adjustments Selected?

Please See Pages 71 and 72 and Mark the Appropriate Box Below:

Yes

No

PLEASE MARK THE APPROPRIATE BOX BELOW:

A Bid Bond is included.

A Cashier's Check or a Certified Check is included.

INSTRUCTIONS

ABOUT IDOT PROPOSALS: All proposals issued by IDOT are potential bidding proposals. Each proposal contains all Certifications and Affidavits, a Proposal Signature Sheet and a Proposal Bid Bond required for Prime Contractors to submit a bid after written **Authorization to Bid** has been issued by IDOT’s Central Bureau of Construction.

HOW MANY PROPOSALS SHOULD PROSPECTIVE BIDDERS REQUEST?: Prospective bidders should, prior to submitting their initial request for plans and proposals, determine their needs and request the total number of plans and proposals needed for each item requested. There will be a nonrefundable charge of \$15 for each set of plans and specifications issued.

WHO CAN BID?: Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT’s Central Bureau of Construction.

WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?: When a prospective prime bidder submits a “Request for Proposal Forms and Plans” he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued a **Proposal Denial and/or Authorization Form**, approved by the Central Bureau of Construction, that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Proposal Denial and/or Authorization Form** will indicate the reason for denial. If a contractor has requested to bid but has not received a **Proposal Denial and/or Authorization Form**, they should contact the Central Bureau of Construction in advance of the letting date.

WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond
2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

ABOUT SUBMITTING BIDS: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?

Questions Regarding	Call
Prequalification and/or Authorization to Bid	217/782-3413
Preparation and submittal of bids	217/782-7806
Mailing of plans and proposals	217/782-7806



1. Proposal of _____

for the improvement officially known as:

(a) Chicago Rockford International Airport

(b) The proposed improvement shown in detail on the plans issued by the Department schedule and detail sheets included herein, includes, in general, the following described work:

Northwest Cargo Apron and Sitework - Phase 2

TO THE DEPARTMENT OF TRANSPORTATION

2. The plans for the proposed work are those issued by the Department of Transportation to cover the work described above.

The specifications are those prepared by the Department of Transportation, Division of Aeronautics and designated as "Standard Specifications for Construction of Airports," adopted January, 1985, the "Supplemental Specifications and Recurring Special Provisions," adopted July 1, 2004 and the "Special Provisions" thereto, adopted and in effect on the date of invitation for bids.

3. **COMPLETION TIME/LIQUIDATED DAMAGES.** It being understood and agreed that the completion within the time limit is an essential part of the contract, the bidder agrees to complete the work within 174 calendar days, unless additional time is granted by the Engineer in accordance with the provisions of the specifications. In case of failure to complete the work on or before the time named herein, or within such extra time as may have been allowed by extensions, the bidder agrees that the Department of Transportation shall withhold from such sum as may be due him/her under the terms of this contract, the costs, as set forth below, which costs shall be considered and treated not as a penalty but as damages due to the State from the bidder by reason of the failure of the bidder to complete the work within the time specified in the contract. The following Schedule of Deductions supersedes the table given in Section 60-09 of the Division's Standard Specifications for Construction of Airports.

Schedule of Deductions for Each Day of Overrun in Contract Time

<u>Original Contract Amount</u>		<u>Daily Charge</u>
<u>From More Than</u>	<u>To and Including</u>	<u>Calendar Day</u>
\$ 0	\$ 25,000	\$ 300
25,000	100,000	375
100,000	500,000	550
500,000	1,000,000	725
1,000,000	2,000,000	900
2,000,000	3,000,000	1,100
3,000,000	5,000,000	1,300
5,000,000	7,500,000	1,450
7,500,000	10,000,000	1,650

A daily charge shall be made for every day shown on the calendar beyond the specified contract time in calendar days.

RETURN WITH BID

4. **ASSURANCE OF EXAMINATION AND INSPECTION/WAIVER.** The undersigned further declares that he/she has carefully examined the proposal, plans, specifications, supplemental and applicable recurring special provisions, form of contract and contract bonds, and special provisions, and that he/she has inspected in detail the site of the proposed work, and that he/she has familiarized themselves with all of the local conditions affecting the contract and the detailed requirements of construction, and understands that in making this proposal he/she waives all right to plead any misunderstanding regarding the same.

5. **EXECUTION OF CONTRACT AND CONTRACT BONDS.** The undersigned further agrees to execute a contract for this work and present the same to the department within fifteen (15) days after the contract has been mailed to him/her. The undersigned further agrees that he/she and his/her surety will execute and present within fifteen (15) days after the contract has been mailed to him/her contract bonds satisfactory to and in the form prescribed by the Department of Transportation, in the penal sum of the full amount of the contract, guaranteeing the faithful performance of the work in accordance with the terms of the contract and guaranteeing payment in full all bills and accounts for materials and labor used in the construction of the work.

6. **PROPOSAL GUARANTY.** Accompanying this proposal is either a bid bond on the department form, executed by a corporate surety company satisfactory to the department, or a proposal guaranty check consisting of a bank cashier's check or a properly certified check for not less than 5 per cent of the amount bid or for the amount specified in the following schedule:

<u>Amount of Bid</u>	<u>Proposal Guaranty</u>	<u>Amount of Bid</u>	<u>Proposal Guaranty</u>
Up to \$5,000	to \$5,000\$150	\$2,000,000	to \$3,000,000 \$100,000
\$5,000	to \$10,000\$300	\$3,000,000	to \$5,000,000 \$150,000
\$10,000	to \$50,000\$1,000	\$5,000,000	to \$7,500,000 \$250,000
\$50,000	to \$100,000\$3,000	\$7,500,000	to \$10,000,000 \$400,000
\$100,000	to \$150,000\$5,000	\$10,000,000	to \$15,000,000 \$500,000
\$150,000	to \$250,000\$7,500	\$15,000,000	to \$20,000,000 \$600,000
\$250,000	to \$500,000\$12,500	\$20,000,000	to \$25,000,000\$700,000
\$500,000	to \$1,000,000\$25,000	\$25,000,000	to \$30,000,000 \$800,000
\$1,000,000	to \$1,500,000\$50,000	\$30,000,000	to \$35,000,000 \$900,000
\$1,500,000	to \$2,000,000\$75,000	over	\$35,000,000 \$1,000,000

Bank cashier's checks or properly certified checks accompanying proposals shall be made payable to the Treasurer, State of Illinois, when the state is awarding authority; the county treasurer, when a county is the awarding authority; or the city, village, or town treasurer, when a city, village, or town is the awarding authority.

If a combination bid is submitted, the proposal guaranties which accompany the individual proposals making up the combination will be considered as also covering the combination bid.

The amount of the proposal guaranty check is _____ \$(). If this proposal is accepted and the undersigned shall fail to execute contract bonds as required herein, it is hereby agreed that the amount of the proposal guaranty shall become the property of the State of Illinois, and shall be considered as payment of damages due to delay and other causes suffered by the State because of the failure to execute said contract and contract bonds; otherwise, the bid bond shall become void or the proposal guaranty check shall be returned to the undersigned.

RETURN WITH BID

(e) The plans and Special Provisions for each separate contract shall be construed separately for all requirements, except as described in paragraphs (a) through (d) listed above.

When a combination bid is submitted, the schedule below must be completed in each proposal comprising the combination.

If alternate bids are submitted for one or more of the sections comprising the combination, a combination bid must be submitted for each alternate.

Schedule of Combination Bids

Combination No.	Sections Included in Combination	Combination Bid	
		Dollars	Cents

8. **SCHEDULE OF PRICES.** The undersigned submits herewith his/her schedule of prices covering the work to be performed under this contract; he/she understands that he/she must show in the schedule the unit prices (with no more than two decimal places, i.e. \$25.35, not \$25.348) for which he/she proposes to perform each item of work, that the extensions must be made by him/her, and that if not so done his/her proposal may be rejected as irregular.

The undersigned further agrees that the unit prices submitted herewith are for the purpose of obtaining a gross sum, and for use in computing the value of additions and deductions; that if there is a discrepancy between the gross sum bid and that resulting from the summation of the quantities multiplied by their respective unit prices, the latter shall govern.

COUNTY NAME	CODE	DIST	AIRPORT NAME	FED PROJECT	ILL PROJECT
WINNEBAGO	201	02	CHICAGO ROCKFORD INTERNATIONAL	3-17-0088-XX	RF-D -3787

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR106504	APRON LIGHT POLE W/QUAD FIXTURE	EACH	3.000	X			
AR108030	1/C #3/0 600V UG CABLE	L.F.	500.000	X			
AR108086	1/C #6 XLP-USE	L.F.	3,400.000	X			
AR108090	1/C #10 XLP-USE	L.F.	3,000.000	X			
AR108158	1/C #8 5 KV UG CABLE IN UD	L.F.	5,062.000	X			
AR108752	1/C #2 GROUND	L.F.	150.000	X			
AR109120	ERECT ELECTRICAL ENCLOSURE	L.S.	1.000	X			
AR110213	3" STEEL DUCT, DIRECT BURY	L.F.	1,150.000	X			
AR110502	2-WAY CONCRETE ENCASED DUCT	L.F.	210.000	X			
AR110504	4-WAY CONCRETE ENCASED DUCT	L.F.	925.000	X			
AR110610	ELECTRICAL HANDHOLE	EACH	6.000	X			
AR110900	REMOVE DUCT	L.F.	240.000	X			
AR125100	ELEVATED RETROREFLECTIVE MARKER	EACH	16.000	X			
AR125415	MILT-BASE MOUNTED	EACH	32.000	X			
AR125442	TAXI GUIDANCE SIGN, 2 CHARACTER	EACH	2.000	X			

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR125444	TAXI GUIDANCE SIGN, 4 CHARACTER	EACH	1.000 X	=		=	
AR125902	REMOVE BASE MOUNTED LIGHT	EACH	8.000 X	=		=	
AR150510	ENGINEER'S FIELD OFFICE	L.S.	1.000 X	=		=	
AR150515	FIELD LABORATORY	L.S.	1.000 X	=		=	
AR150520	MOBILIZATION	L.S.	1.000 X	=		=	
AR150540	HAUL ROUTE	L.S.	1.000 X	=		=	
AR152410	UNCLASSIFIED EXCAVATION	C.Y.	40,000.000 X	=		=	
AR152442	OFFSITE BORROW EXCAVATION	C.Y.	81,000.000 X	=		=	
AR152540	SOIL STABILIZATION FABRIC	S.Y.	49,800.000 X	=		=	
AR156510	SILT FENCE	L.F.	3,215.000 X	=		=	
AR156511	DITCH CHECK	EACH	15.000 X	=		=	
AR156520	INLET PROTECTION	EACH	30.000 X	=		=	
AR156531	EROSION CONTROL BLANKET	S.Y.	68,600.000 X	=		=	
AR156540	RIPRAP	S.Y.	250.000 X	=		=	
AR162410	CLASS E FENCE, VINYL-10'	L.F.	1,670.000 X	=		=	

CHICAGO ROCKFORD INTERNATIONAL
WINNEBAGO

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - R0014

ECMS002 DTGECM03 ECMR003 PAGE 3
RUN DATE - 04/02/08
RUN TIME - 213805

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR162620	CLASS E GATE-20'	EACH	2.000 X				
AR162900	REMOVE CLASS E FENCE	L.F.	900.000 X				
AR162960	RELOCATE CLASS E FENCE	L.F.	2,400.000 X				
AR201610	BITUMINOUS BASE COURSE	TON	2,400.000 X				
AR208515	POROUS GRANULAR EMBANKMENT	C.Y.	1,225.000 X				
AR209606	CRUSHED AGG. BASE COURSE - 6"	S.Y.	3,850.000 X				
AR209608	CRUSHED AGG. BASE COURSE - 8"	S.Y.	51,105.000 X				
AR401610	BITUMINOUS SURFACE COURSE	TON	2,045.000 X				
AR401650	BITUMINOUS PAVEMENT MILLING	S.Y.	10,600.000 X				
AR401910	REMOVE & REPLACE BIT. PAVEMENT	S.Y.	335.000 X				
AR501516	16" PCC PAVEMENT	S.Y.	36,500.000 X				
AR501530	PCC TEST BATCH	EACH	1.000 X				
AR501910	REMOVE & REPLACE PCC PAVEMENT	S.Y.	20.000 X				
AR510515	GROUND ROD	EACH	22.000 X				
AR602510	BITUMINOUS PRIME COAT	GAL.	4,810.000 X				

CHICAGO ROCKFORD INTERNATIONAL
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ILLINOIS DEPARTMENT OF TRANSPORTATION
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RUN DATE - 04/02/08
RUN TIME - 213805

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR603510	BITUMINOUS TACK COAT	GAL.	3,365.000 X				
AR620520	PAVEMENT MARKING-WATERBORNE	S.F.	9,310.000 X				
AR620525	PAVEMENT MARKING-BLACK BORDER	S.F.	5,350.000 X				
AR620900	PAVEMENT MARKING REMOVAL	S.F.	800.000 X				
AR701006	6" PVC STORM SEWER	L.F.	370.000 X				
AR701224	24" CMP	L.F.	190.000 X				
AR701512	12" RCP, CLASS IV	L.F.	567.000 X				
AR701518	18" RCP, CLASS IV	L.F.	486.000 X				
AR701524	24" RCP, CLASS IV	L.F.	195.000 X				
AR701530	30" RCP, CLASS IV	L.F.	115.000 X				
AR701536	36" RCP, CLASS IV	L.F.	228.000 X				
AR701542	42" RCP, CLASS IV	L.F.	341.000 X				
AR701548	48" RCP, CLASS IV	L.F.	698.000 X				
AR701572	72" RCP, CLASS IV	L.F.	1,380.000 X				
AR701900	REMOVE PIPE	L.F.	400.000 X				

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR705900	REMOVE UNDERDRAIN	L.F.	840.000 X				
AR705904	REMOVE UNDERDRAIN CLEANOUT	EACH	2.000 X				
AR751001	TRENCH DRAIN	L.F.	300.000 X				
AR751412	INLET-TYPE B	EACH	3.000 X				
AR751550	MANHOLE 5'	EACH	2.000 X				
AR751560	MANHOLE 6'	EACH	5.000 X				
AR751567	MANHOLE 7'	EACH	3.000 X				
AR751568	MANHOLE 8'	EACH	5.000 X				
AR751903	REMOVE MANHOLE	EACH	1.000 X				
AR752224	METAL END SECTION 24"	EACH	6.000 X				
AR752412	PRECAST REINFORCED CONC. FES 12"	EACH	4.000 X				
AR752472	PRECAST REINFORCED CONC. FES 72"	EACH	1.000 X				
AR752512	GRATING FOR CONC. FES 12"	EACH	4.000 X				
AR752572	GRATING FOR CONC. FES 72"	EACH	1.000 X				
AR752900	REMOVE END SECTION	EACH	5.000 X				

CHICAGO ROCKFORD INTERNATIONAL
WINNEBAGO

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - R0014

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RUN DATE - 04/02/08
RUN TIME - 213805

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR760301	1" WATER MAIN	L.F.	150.000 X				
AR770508	8" SANITARY SEWER	L.F.	1,218.000 X				
AR770700	SANITARY LIFT STATION	L.S.	1.000 X				
AR770704	SANITARY MANHOLE 4'	EACH	9.000 X				
AR800002	48" CCFRPM	L.F.	398.000 X				
AR800004	72" RCCP ELBOW	EACH	2.000 X				
AR800006	DUCKBILL CHECK VALVE	EACH	1.000 X				
AR800018	MAGNETIC FLOW METER AND VAULT	L.S.	1.000 X				
AR800020	BORING AND JACKING	L.F.	415.000 X				
AR800053	SOIL GUARD	S.Y.	2,500.000 X				
AR800055	BITUMINOUS MILLING PLACEMENT	C.Y.	1,300.000 X				
AR800060	AIR RELEASE VALVE AND VAULT	L.S.	1.000 X				
AR800070	TRAFFIC CONTROL AND PROTECTION	L.S.	1.000 X				
AR800072	12' X 12' BOX MANHOLE	EACH	1.000 X				
AR800073	7' X 12' BOX MANHOLE	EACH	3.000 X				

CHICAGO ROCKFORD INTERNATIONAL
WINNEBAGO

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - R0014

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RUN DATE - 04/02/08
RUN TIME - 213805

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR800090	7' X 15.5' BOX MANHOLE	EACH	1.000 X				
AR800094	DIVERSION STRUCTURE	L.S.	1.000 X				
AR800095	15" SANITARY SEWER	L.F.	1,450.000 X				
AR800096	10" FORCE MAIN	L.F.	2,890.000 X				
AR800126	STORM WATER SAMPLING EQUIPMENT	L.S.	1.000 X				
AR800131	STORM WATER SAMPLING BUILDING ELE	L.S.	1.000 X				
AR800132	CHEMICAL/ELECTRICAL BUILDING MODI	L.S.	1.000 X				
AR800195	STORM WATER SAMPLING BUILDING	L.S.	1.000 X				
AR800196	BUILDING FOUNDATION AND FLOOR	L.S.	1.000 X				
AR901510	SEEDING	ACRE	26.000 X				
AR908510	MULCHING	ACRE	11.000 X				

TOTAL \$

NOTE:
*** PLEASE TURN PAGE FOR IMPORTANT NOTES ***

CHICAGO ROCKFORD INTERNATIONAL
WINNEBAGO

ILLINOIS DEPARTMENT OF TRANSPORTATION
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NOTE:

1. EACH PAY ITEM SHOULD HAVE A UNIT PRICE AND A TOTAL PRICE.
2. THE UNIT PRICE SHALL GOVERN IF NO TOTAL PRICE IS SHOWN OR IF THERE IS A DISCREPANCY BETWEEN THE PRODUCT OF THE UNIT PRICE MULTIPLIED BY THE QUANTITY.
3. IF A UNIT PRICE IS OMITTED, THE TOTAL PRICE WILL BE DIVIDED BY THE QUANTITY IN ORDER TO ESTABLISH A UNIT PRICE.
4. A BID MAY BE DECLARED UNACCEPTABLE IF NEITHER A UNIT PRICE NOR A TOTAL PRICE IS SHOWN.

RETURN WITH BID

THE PRECEDING SCHEDULE OF PRICES MUST BE

COMPLETED AND RETURNED.

RETURN WITH BID

**STATE REQUIRED ETHICAL
STANDARDS GOVERNING CONTRACT
PROCUREMENT: ASSURANCES, CERTIFICATIONS
AND DISCLOSURES**

I. GENERAL

A. Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

B. In order to comply with the provisions of Article 50 and to carry out the duty established therein, all bidders are to adhere to ethical standards established for the procurement process, and to make such assurances, disclosures and certifications required by law. By execution of the Proposal Signature Sheet, the bidder indicates that each of the mandated assurances has been read and understood, that each certification is made and understood, and that each disclosure requirement has been understood and completed.

C. In addition to all other remedies provided by law, failure to comply with any assurance, failure to make any disclosure or the making of a false certification shall be grounds for termination of the contract and the suspension or debarment of the bidder.

II. ASSURANCES

A. The assurances hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous assurance, and the surety providing the performance bond shall be responsible for the completion of the contract.

B. Felons

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any state agency from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-10.

C. Conflicts of Interest

1. The Illinois Procurement Code provides in pertinent part:

Section 50-13. Conflicts of Interest.

(a) Prohibition. It is unlawful for any person holding an elective office in this State, holding a seat in the General Assembly, or appointed to or employed in any of the offices or agencies of state government and who receives compensation for such employment in excess of 60% of the salary of the Governor of the State of Illinois, or who is an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority, or who is the spouse or minor child of any such person to have or acquire any contract, or any direct pecuniary interest in any contract therein, whether for stationery, printing, paper, or any services, materials, or supplies, that will be wholly or partially satisfied by the payment of funds appropriated by the General Assembly of the State of Illinois or in any contract of the Capital Development Board or the Illinois Toll Highway authority.

(b) Interests. It is unlawful for any firm, partnership, association or corporation, in which any person listed in subsection (a) is entitled to receive (i) more than 7 1/2% of the total distributable income or (ii) an amount in excess of the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(c) Combined interests. It is unlawful for any firm, partnership, association, or corporation, in which any person listed in subsection (a) together with his or her spouse or minor children is entitled to receive (i) more than 15%, in the aggregate, of the total distributable income or (ii) an amount in excess of 2 times the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(d) Securities. Nothing in this Section invalidates the provisions of any bond or other security previously offered or to be offered for sale or sold by or for the State of Illinois.

(e) Prior interests. This Section does not affect the validity of any contract made between the State and an officer or employee of the State or member of the General Assembly, his or her spouse, minor child or any combination of those persons if that contract was in existence before his or her election or employment as an officer, member, or employee. The contract is voidable, however, if it cannot be completed within 365 days after the officer, member, or employee takes office or is employed.

The current salary of the Governor is \$150,700.00. Sixty percent of the salary is \$90,420.00.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-13, or that an effective exemption has been issued by the Board of Ethics to any individual subject to the Section 50-13 prohibitions pursuant to the provisions of Section 50-20 of the Code and Executive Order Number 3 (1998). Information concerning the exemption process is available from the Department upon request.

D. Negotiations

1. The Illinois Procurement Code provides in pertinent part:

Section 50-15. Negotiations.

(a) It is unlawful for any person employed in or on a continual contractual relationship with any of the offices or agencies of State government to participate in contract negotiations on behalf of that office or agency with any firm, partnership, association, or corporation with whom that person has a contract for future employment or is negotiating concerning possible future employment.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-15, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

RETURN WITH BID

E. Inducements

1. The Illinois Procurement Code provides:

Section 50-25. Inducement. Any person who offers or pays any money or other valuable thing to any person to induce him or her not to bid for a State contract or as recompense for not having bid on a State contract is guilty of a Class 4 felony. Any person who accepts any money or other valuable thing for not bidding for a State contract or who withholds a bid in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-25, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

F. Revolving Door Prohibition

1. The Illinois Procurement Code provides:

Section 50-30. Revolving door prohibition. Chief procurement officers, associate procurement officers, State purchasing officers, their designees whose principal duties are directly related to State procurement, and executive officers confirmed by the Senate are expressly prohibited for a period of 2 years after terminating an affected position from engaging in any procurement activity relating to the State agency most recently employing them in an affected position for a period of at least 6 months. The prohibition includes, but is not limited to: lobbying the procurement process; specifying; bidding; proposing bid, proposal, or contract documents; on their own behalf or on behalf of any firm, partnership, association, or corporation. This Section applies only to persons who terminate an affected position on or after January 15, 1999.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-30, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

G. Reporting Anticompetitive Practices

1. The Illinois Procurement Code provides:

Section 50-40. Reporting anticompetitive practices. When, for any reason, any vendor, bidder, contractor, chief procurement officer, State purchasing officer, designee, elected official, or State employee suspects collusion or other anticompetitive practice among any bidders, offers, contractors, proposers, or employees of the State, a notice of the relevant facts shall be transmitted to the Attorney General and the chief procurement officer.

2. The bidder assures the Department that it has not failed to report any relevant facts concerning the practices addressed in Section 50-40 which may involve the contract for which the bid is submitted.

H. Confidentiality

1. The Illinois Procurement Code provides:

Section 50-45. Confidentiality. Any chief procurement officer, State purchasing officer, designee, or executive officer who willfully uses or allows the use of specifications, competitive bid documents, proprietary competitive information, proposals, contracts, or selection information to compromise the fairness or integrity of the procurement, bidding, or contract process shall be subject to immediate dismissal, regardless of the Personnel code, any contract, or any collective bargaining agreement, and may in addition be subject to criminal prosecution.

2. The bidder assures the Department that it has no knowledge of any fact relevant to the practices addressed in Section 50-45 which may involve the contract for which the bid is submitted.

RETURN WITH BID

I. Insider Information

1. The Illinois Procurement Act provides:

Section 50-50. Insider information. It is unlawful for any current or former elected or appointed State official or State employee to knowingly use confidential information available only by virtue of that office or employment for actual or anticipated gain for themselves or another person.

2. The bidder assures the Department that it has no knowledge of any facts relevant to the practices addressed in Section 50-50 which may involve the contract for which the bid is submitted.

III. CERTIFICATIONS

A. The certifications hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous certification, and the surety providing the performance bond shall be responsible for completion of the contract.

B. Bribery

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State shall contain a certification by the contractor that the contractor is not barred from being awarded a contract or subcontract under this Section. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The bidder certifies that it is not barred from being awarded a contract under Section 50.5.

RETURN WITH BID

C. Educational Loan

1. Section 3 of the Educational Loan Default Act provides:

§ 3. No State agency shall contract with an individual for goods or services if that individual is in default, as defined in Section 2 of this Act, on an educational loan. Any contract used by any State agency shall include a statement certifying that the individual is not in default on an educational loan as provided in this Section.

2. The bidder, if an individual as opposed to a corporation, partnership or other form of business organization, certifies that the bidder is not in default on an educational loan as provided in Section 3 of the Act.

D. Bid-Rigging/Bid Rotating

1. Section 33E-11 of the Criminal Code of 1961 provides:

§ 33E-11. (a) Every bid submitted to and public contract executed pursuant to such bid by the State or a unit of local government shall contain a certification by the prime contractor that the prime contractor is not barred from contracting with any unit of State or local government as a result of a violation of either Section 33E-3 or 33E-4 of this Article. The State and units of local government shall provide the appropriate forms for such certification.

(b) A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

A violation of Section 33E-3 would be represented by a conviction of the crime of bid-rigging which, in addition to Class 3 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be barred for 5 years from the date of conviction from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

A violation of Section 33E-4 would be represented by a conviction of the crime of bid-rotating which, in addition to Class 2 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be permanently barred from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

2. The bidder certifies that it is not barred from contracting with the Department by reason of a violation of either Section 33E-3 or Section 33E-4.

E. International Anti-Boycott

1. Section 5 of the International Anti-Boycott Certification Act provides:

§ 5. State contracts. Every contract entered into by the State of Illinois for the manufacture, furnishing, or purchasing of supplies, material, or equipment or for the furnishing of work, labor, or services, in an amount exceeding the threshold for small purchases according to the purchasing laws of this State or \$10,000.00, whichever is less, shall contain certification, as a material condition of the contract, by which the contractor agrees that neither the contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

2. The bidder makes the certification set forth in Section 5 of the Act.

RETURN WITH BID

F. Drug Free Workplace

1. The Illinois “Drug Free Workplace Act” applies to this contract and it is necessary to comply with the provisions of the “Act” if the contractor is a corporation, partnership, or other entity (including a sole proprietorship) which has 25 or more employees.

2. The bidder certifies that if awarded a contract in excess of \$5,000 it will provide a drug free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance, including cannabis, is prohibited in the contractor’s workplace; specifying the actions that will be taken against employees for violations of such prohibition; and notifying the employee that, as a condition of employment on such contract, the employee shall abide by the terms of the statement, and notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

(b) Establishing a drug free awareness program to inform employees about the dangers of drug abuse in the workplace; the contractor’s policy of maintaining a drug free workplace; any available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug violations.

(c) Providing a copy of the statement required by subparagraph (1) to each employee engaged in the performance of the contract and to post the statement in a prominent place in the workplace.

(d) Notifying the Department within ten (10) days after receiving notice from an employee or otherwise receiving actual notice of the conviction of an employee for a violation of any criminal drug statute occurring in the workplace.

(e) Imposing or requiring, within 30 days after receiving notice from an employee of a conviction or actual notice of such a conviction, an appropriate personnel action, up to and including termination, or the satisfactory participation in a drug abuse assistance or rehabilitation program approved by a federal, state or local health, law enforcement or other appropriate agency.

(f) Assisting employees in selecting a course of action in the event drug counseling, treatment, and rehabilitation is required and indicating that a trained referral team is in place.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of the actions and efforts stated in this certification.

G. Debt Delinquency

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder certifies that it, or any affiliate, is not barred from being awarded a contract under 30 ILCS 500. Section 50-11 prohibits a person from entering into a contract with a State agency if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The contractor further acknowledges that the contracting State agency may declare the contract void if this certification is false or if the contractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

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H. Sarbanes-Oxley Act of 2002

1. The Illinois Procurement Code provides:

Section 50-60(c).

The contractor certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 for a period of five years prior to the date of the bid or contract. The contractor acknowledges that the contracting agency shall declare the contract void if this certification is false.

I. Addenda

The contractor or bidder certifies that all relevant addenda have been incorporated in to this contract. Failure to do so may cause the bid to be declared unacceptable.

J. Section 42 of the Environmental Protection Act

The contractor certifies in accordance with 30 ILCS 500/50-12 that the bidder or contractor is not barred from being awarded a contract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The contractor acknowledges that the contracting agency may declare the contract void if this certification is false.

K. Apprenticeship and Training Certification

In accordance with the provisions of Section 30-22 (6) of the Illinois Procurement Code, the bidder certifies that it is a participant, either as an individual or as part of a group program, in the approved apprenticeship and training programs applicable to each type of work or craft that the bidder will perform with its own forces. The bidder further certifies for work that will be performed by subcontract that each of its subcontractors submitted for approval either (a) is, at the time of such bid, participating in an approved, applicable apprenticeship and training program; or (b) will, prior to commencement of performance of work pursuant to this contract, begin participation in an approved apprenticeship and training program applicable to the work of the subcontract. The Department, at any time before or after award, may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. Applicable apprenticeship and training programs are those that have been approved and registered with the United States Department of Labor. The bidder shall list in the space below, the official name of the program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder's forces. Types of work or craft work that will be subcontracted shall be included and listed as subcontracted work. The list shall also indicate any type of work or craft job category that does not have an applicable apprenticeship or training program. **The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project as reported on the Construction Employee Workforce Projection (Form BC-1256) and returned with the bid is accounted for and listed.**

The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. In order to fulfill this requirement, it shall not be necessary that an applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract.

RETURN WITH BID

L. Executive Order Number 1 (2007) Regarding Lobbying on Government Procurements

The bidder hereby warrants and certifies that they have complied and will comply with the requirements set forth in this Order. The requirements of this warrant and certification are a material part of the contract, and the contractor shall require this warrant and certification provision to be included in all approved subcontracts.

M. Disclosure of Business Operations in Iran

Public Act 95-0616 provides that each bid, offer, or proposal submitted for a State contract shall include a disclosure of whether or not the Company acting as the bidder, offeror, or proposing entity, or any of its corporate parents or subsidiaries, within the 24 months before submission of the bid, offer, or proposal had business operations that involved contracts with or provision of supplies or services to the Government of Iran, companies in which the Government of Iran has any direct or indirect equity share, consortiums or projects commissioned by the Government of Iran, or companies involved in consortiums or projects commissioned by the Government of Iran and either of the following conditions apply:

(1) More than 10% of the Company's revenues produced in or assets located in Iran involve oil-related activities or mineral-extraction activities; less than 75% of the Company's revenues produced in or assets located in Iran involve contracts with or provision of oil-related or mineral-extraction products or services to the Government of Iran or a project or consortium created exclusively by that government; and the Company has failed to take substantial action.

(2) The Company has, on or after August 5, 1996, made an investment of \$20 million or more, or any combination of investments of at least \$10 million each that in the aggregate equals or exceeds \$20 million in any 12-month period, which directly or significantly contributes to the enhancement of Iran's ability to develop petroleum resources of Iran.

The terms "Business operations", "Company", "Mineral-extraction activities", "Oil-related activities", "Petroleum resources", and "Substantial action" are all defined in the Act.

Failure to make the disclosure required by the Act shall cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid, offer, or proposal or awarding the contract. The name of each Company disclosed as doing business or having done business in Iran will be provided to the State Comptroller.

Check the appropriate statement:

Company has no business operations in Iran to disclose.

Company has business operations in Iran as disclosed in the attached document.

RETURN WITH BID

N. PA 95-0635 SUBSTANCE ABUSE PREVENTION PROGRAM (SAPP)

Effective January 1, 2008

This Public Act requires that all contractors and subcontractors on Prevailing Wage Projects have a SAPP, meeting certain requirements, in place before starting work.

The as read low bidder is required to submit a correctly completed SAPP Certification Form BC 261 within seven (7) working days after the Letting. The Department will not accept a SAPP that does not meet the seven day submittal requirement and the bid will be declared not responsive. In the event the bid is declared not responsive due to failure to comply the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, may deny authorization to bid the project if re-advertised for bids and may not allow the bidder to participate on subsequent Lettings.

Submittal and approval of the bidder's SAPP is a condition of award.

The SAPP is to be submitted to the Bureau of Design & Environment, Contracts Office, Room 326, 2300 South Dirksen Parkway, Springfield IL 62764. Voice 217-782-7806. Fax 217-785-1141. It is the bidder's responsibility to obtain confirmation of delivery.

The requirements of this Public Act are a material part of the contract, and the contractor shall require this provision to be included in all approved subcontracts. The contractor shall submit the correctly completed SAPP Certification Form BC 261 for each subcontractor with the Request for Approval of Subcontractor.

RETURN WITH BID

IV. DISCLOSURES

A. The disclosures hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous disclosure, and the surety providing the performance bond shall be responsible for completion of the contract.

B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all bids of more than \$10,000 shall be accompanied by disclosure of the financial interests of the bidder. This disclosed information for the successful bidder, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the bidding entity or its parent entity, whichever is less, unless the contractor or bidder is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, proposals, leases, or other ongoing procurement relationships the bidding entity has with any other unit of state government and shall clearly identify the unit and the contract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

C. Disclosure Form Instructions

Form A: For bidders that have previously submitted the information requested in Form A

The Department has retained the Form A disclosures submitted by all bidders responding to these requirements for the April 24, 1998 or any subsequent letting conducted by the Department. The bidder has the option of submitting the information again or the bidder may sign the following certification statement indicating that the information previously submitted by the bidder is, as of the date of signature, current and accurate. The Certification must be signed and dated by a person who is authorized to execute contracts for the bidding company. Before signing this certification, the bidder should carefully review its prior submissions to ensure the Certification is correct. If the Bidder signs the Certification, the Bidder should proceed to Form B instructions.

CERTIFICATION STATEMENT

I have determined that the Form A disclosure information previously submitted is current and accurate, and all forms are hereby incorporated by reference in this bid. Any necessary additional forms or amendments to previously submitted forms are attached to this bid.

(Bidding Company)

Name of Authorized Representative (type or print)

Title of Authorized Representative (type or print)

Signature of Authorized Representative

Date

Form A: For bidders who have NOT previously submitted the information requested in Form A

If the bidder is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a bidder is not subject to Federal 10K reporting, the bidder must determine if any individuals are required by law to complete a financial disclosure form. To do this, the bidder should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on the second page of Form A must be signed and dated by a person that is authorized to execute contracts for the bidding company. Note These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES _____ NO _____
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than \$87,526.20? YES _____ NO _____
3. Does anyone in your organization receive more than \$87,526.20 of the bidding entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES _____ NO _____
4. Does anyone in your organization receive greater than 5% of the bidding entity's or parent entity's total distributive income, but which is less than \$87,526.20? YES _____ NO _____

(Note: Only one set of forms needs to be completed per person per bid even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The bidder must determine each individual in the bidding entity or the bidding entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable.** The person signing can be, but does not have to be, the person for which the form is being completed. The bidder is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT on page 2 of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

Form B: Identifying Other Contracts & Procurement Related Information Disclosure Form B must be completed for each bid submitted by the bidding entity. It must be signed by an individual who is authorized to execute contracts for the bidding entity. *Note: Signing the NOT APPLICABLE STATEMENT on Form A does not allow the bidder to ignore Form B. Form B must be completed, signed and dated or the bidder may be considered nonresponsive and the bid will not be accepted.*

The Bidder shall identify, by checking Yes or No on Form B, whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the bidder only needs to complete the signature box on the bottom of Form B. If "Yes" is checked, the bidder must do one of the following:

Option I: If the bidder did not submit an Affidavit of Availability to obtain authorization to bid, the bidder must list all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Do not include IDOT contracts. Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included. Bidders who submit Affidavits of Availability are suggested to use Option II.

Option II: If the bidder is required and has submitted an Affidavit of Availability in order to obtain authorization to bid, the bidder may write or type "See Affidavit of Availability" which indicates that the Affidavit of Availability is incorporated by reference and includes all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. For any contracts that are not covered by the Affidavit of Availability, the bidder must identify them on Form B or on an attached sheet(s). These might be such things as leases.

D. Bidders Submitting More Than One Bid

Bidders submitting multiple bids may submit one set of forms consisting of all required Form A disclosures and one Form B for use with all bids. Please indicate in the space provided below the bid item that contains the original disclosure forms and the bid items which incorporate the forms by reference.

- The bid submitted for letting item _____ contains the Form A disclosures or Certification Statement and the Form B disclosures. The following letting items incorporate the said forms by reference:

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**Form A
Financial Information &
Potential Conflicts of Interest
Disclosure**

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number		Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Vendors desiring to enter into a contract with the State of Illinois must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of \$10,000, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

DISCLOSURE OF FINANCIAL INFORMATION

1. Disclosure of Financial Information. The individual named below has an interest in the BIDDER (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than \$87,526.20 (60% of the Governor’s salary as of 10/1/2000). **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

FOR INDIVIDUAL (type or print information)	
NAME:	_____
ADDRESS	_____
Type of ownership/distributable income share:	
stock _____	sole proprietorship _____
partnership _____	other: (explain on separate sheet): _____
% or \$ value of ownership/distributable income share: _____	

2. Disclosure of Potential Conflicts of Interest. Check “Yes” or “No” to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is “Yes”, please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services.
Yes _____ No _____

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment for services in the previous 2 years.
Yes _____ No _____

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years.
Yes _____ No _____

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter
Yes _____ No _____

RETURN WITH BID/OFFER

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United States of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years.

Yes _____ No _____

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter.

Yes _____ No _____

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government.

Yes _____ No _____

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter.

Yes _____ No _____

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.

Yes _____ No _____

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.

Yes _____ No _____

APPLICABLE STATEMENT

This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page.

Completed by:

Name of Authorized Representative (type or print)

Completed by:

Title of Authorized Representative (type or print)

Completed by:

Signature of Individual or Authorized Representative

Date

NOT APPLICABLE STATEMENT

I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.

This Disclosure Form A is submitted on behalf of the CONTRACTOR listed on the previous page.

Name of Authorized Representative (type or print)

Title of Authorized Representative (type or print)

Signature of Authorized Representative

Date

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**Form B
Other Contracts &
Procurement Related Information
Disclosure**

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number		Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of \$10,000, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The BIDDER shall identify whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes _____ No _____

If **“No”** is checked, the bidder only needs to complete the signature box on the bottom of this page.

2. If “Yes” is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE SIGNED

Name of Authorized Representative (type or print)	

Title of Authorized Representative (type or print)	
_____	_____
Signature of Authorized Representative	Date

RETURN WITH BID

SPECIAL NOTICE TO CONTRACTORS

The following requirements of the Illinois Department of Human Rights' Rules and Regulations are applicable to bidders on all construction contracts advertised by the Illinois Department of Transportation:

CONSTRUCTION EMPLOYEE UTILIZATION PROJECTION

- (a) All bidders on construction contracts shall complete and submit, along with and as part of their bids, a Bidder's Employee Utilization Form (Form BC-1256) setting forth a projection and breakdown of the total workforce intended to be hired and/or allocated to such contract work by the bidder including a projection of minority and female employee utilization in all job classifications on the contract project.
- (b) The Department of Transportation shall review the Employee Utilization Form, and workforce projections contained therein, of the contract awardee to determine if such projections reflect an underutilization of minority persons and/or women in any job classification in accordance with the Equal Employment Opportunity Clause and Section 7.2 of the Illinois Department of Human Rights' Rules and Regulations for Public Contracts adopted as amended on September 17, 1980. If it is determined that the contract awardee's projections reflect an underutilization of minority persons and/or women in any job classification, it shall be advised in writing of the manner in which it is underutilizing and such awardee shall be considered to be in breach of the contract unless, prior to commencement of work on the contract project, it submits revised satisfactory projections or an acceptable written affirmative action plan to correct such underutilization including a specific timetable geared to the completion stages of the contract.
- (c) The Department of Transportation shall provide to the Department of Human Rights a copy of the contract awardee's Employee Utilization Form, a copy of any required written affirmative action plan, and any written correspondence related thereto. The Department of Human Rights may review and revise any action taken by the Department of Transportation with respect to these requirements.



PART I. IDENTIFICATION

Human Rights

Bid Number: _____ Duration of Project: _____

Name of Bidder: _____

PART II. WORKFORCE PROJECTION

A. The undersigned bidder has analyzed minority group and female populations, unemployment rates and availability of workers for the location in which this contract work is to be performed, and for the locations from which the bidder recruits employees, and hereby submits the following workforce projection including a projection for minority and female employee utilization in all job categories in the workforce to be allocated to this contract:

TABLE A
TOTAL Workforce Projection for Contract

JOB CATEGORIES	TOTAL EMPLOYEES		MINORITY EMPLOYEES						TRAINEES			
			BLACK		HISPANIC		*OTHER MINOR.		APPRENTICES		ON THE JOB TRAINEES	
	M	F	M	F	M	F	M	F	M	F	M	F
OFFICIALS (MANAGERS)												
SUPERVISORS												
FOREMEN												
CLERICAL												
EQUIPMENT OPERATORS												
MECHANICS												
TRUCK DRIVERS												
IRONWORKERS												
CARPENTERS												
CEMENT MASONS												
ELECTRICIANS												
PIPEFITTERS, PLUMBERS												
PAINTERS												
LABORERS, SEMI-SKILLED												
LABORERS, UNSKILLED												
TOTAL												

TABLE B
CURRENT EMPLOYEES TO BE ASSIGNED TO CONTRACT

CURRENT EMPLOYEES TO BE ASSIGNED TO CONTRACT			
TOTAL EMPLOYEES		MINORITY EMPLOYEES	
M	F	M	F

TABLE C
TOTAL Training Projection for Contract

EMPLOYEES IN TRAINING	TOTAL EMPLOYEES		BLACK		HISPANIC		*OTHER MINOR.	
	M	F	M	F	M	F	M	F
	APPRENTICES							
ON THE JOB TRAINEES								

FOR DEPARTMENT USE ONLY

*Other minorities are defined as Asians (A) or Native Americans (N).
Please specify race of each employee shown in Other Minorities column.
Note: See instructions on page 2

RETURN WITH BID

PART II. WORKFORCE PROJECTION - continued

- B. Included in "Total Employees" under Table A is the total number of **new hires** that would be employed in the event the undersigned bidder is awarded this contract.

The undersigned bidder projects that: (number) _____ new hires would be recruited from the area in which the contract project is located; and/or (number) _____ new hires would be recruited from the area in which the bidder's principal office or base of operation is located.

- C. Included in "Total Employees" under Table A is a projection of numbers of persons to be employed directly by the undersigned bidder as well as a projection of numbers of persons to be employed by subcontractors.

The undersigned bidder estimates that (number) _____ persons will be directly employed by the prime contractor and that (number) _____ persons will be employed by subcontractors.

PART III. AFFIRMATIVE ACTION PLAN

- A. The undersigned bidder understands and agrees that in the event the foregoing minority and female employee utilization projection included under **PART II** is determined to be an underutilization of minority persons or women in any job category, and in the event that the undersigned bidder is awarded this contract, he/she will, prior to commencement of work, develop and submit a written Affirmative Action Plan including a specific timetable (geared to the completion stages of the contract) whereby deficiencies in minority and/or female employee utilization are corrected. Such Affirmative Action Plan will be subject to approval by the contracting agency and the **Department of Human Rights**.
- B. The undersigned bidder understands and agrees that the minority and female employee utilization projection submitted herein, and the goals and timetable included under an Affirmative Action Plan if required, are deemed to be part of the contract specifications.

Company _____ Telephone Number _____

 Address _____

NOTICE REGARDING SIGNATURE

The Bidder's signature on the Proposal Signature Sheet will constitute the signing of this form. The following signature block needs to be completed only if revisions are required.

Signature: _____ Title: _____ Date: _____

- Instructions: All tables must include subcontractor personnel in addition to prime contractor personnel.
- Table A - Include both the number of employees that would be hired to perform the contract work and the total number currently employed (Table B) that will be allocated to contract work, and include all apprentices and on-the-job trainees. The "Total Employees" column should include all employees including all minorities, apprentices and on-the-job trainees to be employed on the contract work.
 - Table B - Include all employees currently employed that will be allocated to the contract work including any apprentices and on-the-job trainees currently employed.
 - Table C - Indicate the racial breakdown of the total apprentices and on-the-job trainees shown in Table A.

RETURN WITH BID

CERTIFICATIONS REQUIRED BY STATE AND/OR FEDERAL LAW. The bidder is required by State and/or Federal law to make the below certifications and assurances as a part of the proposal and contract upon award. It is understood by the bidder that the certifications and assurances made herein are a part of the contract.

By signing the Proposal Signature Sheet, the bidder certifies that he/she has read and completed each of the following certifications and assurances, that required responses are true and correct and that the certified signature of the Proposal Signature Sheet constitutes an endorsement and execution of each certification and assurance as though each was individually signed:

A. By the execution of this proposal, the signing bidder certifies that the bidding entity has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. This statement made by the undersigned bidder is true and correct under penalty of perjury under the laws of the United States.

B. **CERTIFICATION, EQUAL EMPLOYMENT OPPORTUNITY:**

1. Have you participated in any previous contracts or subcontracts subject to the equal opportunity clause.
YES _____ NO _____

2. If answer to #1 is yes, have you filed with the Joint Reporting Committee, the Director of OFCC, any Federal agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements of those organizations? YES _____ NO _____

C. **BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS FOR CONSTRUCTION CONTRACTS (JAN 1991)**

(a) The Aviation Safety and Capacity Expansion Act of 1990 provides that preference be given to steel and manufactured products produced in the United States when funds are expended pursuant to a grant issued under the Airport Improvement Program. The following terms apply:

1. Steel and manufactured products. As used in this clause, steel and manufactured products include (1) steel produced in the United States or (2) a manufactured product produced in the United States, if the cost of its components mined, produced or manufactured in the United States exceeds 60 percent of the cost of all its components and final assembly has taken place in the United States. Components of foreign origin of the same class or kind as the products referred to in subparagraphs (b)(1) or (2) shall be treated as domestic.

2. Components. As used in this clause, components means those articles, materials, and supplies incorporated directly into steel and manufactured products.

3. Cost of Components. This means the costs for production of the components, exclusive of final assembly labor costs.

(b) The successful bidder will be required to assure that only domestic steel and manufactured products will be used by the Contractor, subcontractors, materialmen, and suppliers in the performance of this contract, except those-

- (1) that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, are not produced in the United States in sufficient and reasonably available quantities of a satisfactory quality;

- (2) that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, that domestic preference would be inconsistent with the public interest; or

- (3) that inclusion of domestic material will increase the cost of the overall project contract by more than 25 percent.

(End of Clause)

RETURN WITH BID

D. BUY AMERICAN CERTIFICATE (JAN 1991)

By submitting a bid/proposal under this solicitation, except for those items listed by the offeror below or on a separate and clearly identified attachment to this bid/proposal, the offeror certifies that steel and each manufactured product, is produced in the United States (as defined in the clause Buy American - Steel and Manufactured Products or Buy American - Steel and Manufactured Products For Construction Contracts) and that components of unknown origin are considered to have been produced or manufactured outside the United States.

Offerors may obtain from (IDOT, Division of Aeronautics) lists of articles, materials, and supplies excepted from this provision.

PRODUCT

COUNTRY OF ORIGIN

E. NPDES CERTIFICATION

In accordance with the provisions of the Illinois Environmental Protection Act, the Illinois Pollution Control Board Rules and Regulations (35 Ill. Adm. Code, Subtitle C, Chapter I), and the Clean Water Act, and the regulations thereunder, this certification is required for all construction contracts that will result in the disturbance of one or more acres total land area.

The undersigned bidder certifies under penalty of law that he/she understands the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR100000) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

The Airport Owner or its Agent will:

- 1) prepare, sign and submit the Notice of Intent (NOI)
- 2) conduct site inspections and complete and file the inspection reports
- 3) submit Incidence of Non-Compliance (ION) forms
- 4) submit Notice of Termination (NOT) form

Prior to the issuance of the Notice-to-Proceed, for each erosion control measure identified in the Storm Water Pollution Prevention Plan, the contractor or subcontractor responsible for the control measure(s) must sign the above certification (forms to be provided by the Department).

F. NON-APPROPRIATION CLAUSE

By submitting a bid/proposal under this solicitation the offeror certifies that he/she understands that obligations of the State will cease immediately without penalty or further payment being required in any fiscal year the Illinois General Assembly fails to appropriate or otherwise make available sufficient funds for this contract.

G. Contractor is not delinquent in the payment of any debt to the State (or if delinquent has entered into a deferred payment plan to pay the debt), and Contractor acknowledges the contracting state agency may declare the contract void if this certification is false (30 ILCS 500/50-11, effective July 1, 2002).

RETURN WITH BID

NOTICE TO BIDDERS

1. **TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation at the Harry R. Hanley Building, 2300 South Dirksen Parkway in Springfield, Illinois until 10:00 o'clock a.m., April 25, 2008

. All bids will be gathered, sorted, publicly opened and read in the auditorium at the Department of Transportation's Harry R. Hanley Building shortly after the 10:00 a.m. cut off time.

2. **DESCRIPTION OF WORK.** The proposed improvement, shown in detail on the plans issued by the Department includes, in general, the following described work:

Northwest Cargo Apron and Sitework - Phase 2

3. **INSTRUCTIONS TO BIDDERS.** (a) This Notice, the invitation for bids, proposal and award shall, together with all other documents in accordance with Article 10-15 of the Illinois Standard Specifications for Construction of Airports, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

(b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.

4. **AWARD CRITERIA AND REJECTION OF BIDS.** This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the proposal and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

5. **PRE-BID CONFERENCE.** There will be a pre-bid conference held at N/A at the Chicago Rockford International Airport administration building. For engineering information, contact Jeff Plapp of Crawford, Murphy & Tilly, Inc. at (815) 847-1177.

6. **DISADVANTAGED BUSINESS POLICY.** The DBE goal for this contract is 10.00%.

7. **SPECIFICATIONS AND DRAWINGS.** The work shall be done in accordance with the Illinois Standard Specifications for Construction of Airports, the Illinois Division of Aeronautics Supplemental Specifications and Recurring Special Provisions, the Special Provisions dated February 29, 2008 and the Construction Plans dated February 29, 2008 as approved by the Department of Transportation, Division of Aeronautics.

RETURN WITH BID

- 8. INSPECTION OF RECORDS.** The Contractor shall maintain an acceptable cost accounting system. The Sponsor, the FAA, and the Comptroller General of the United States shall have access to any books, documents, paper, and records of the Contractor which are directly pertinent to the specific contract for the purposes of making an audit, examination, excerpts, and transcriptions. The Contractor shall maintain all required records for three years after the Sponsor makes final payment and all other pending matters are closed.
- 9. RIGHTS TO INVENTIONS.** All rights to inventions and materials generated under this contract are subject to Illinois law and to regulations issued by the FAA and the Sponsor of the Federal grant under which this contract is executed. Information regarding these rights is available from the FAA and the Sponsor.
- 10. TERMINATION OF CONTRACT.**
1. The Sponsor may, by written notice, terminate this contract in whole or in part at any time, either for the Sponsor's convenience or because of failure to fulfill the contract obligations. Upon receipt of such notice services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this contract, whether completed or in progress, delivered to the Sponsor.
 2. If the termination is for the convenience of the Sponsor, an equitable adjustment in the contract price shall be made, but no amount shall be allowed for anticipated profit on unperformed services.
 3. If the termination is due to failure to fulfill the Contractor's obligations, the Sponsor may take over the work and prosecute the same to completion by contract or otherwise. In such case, the Contractor shall be liable to the Sponsor for any additional cost occasioned to the Sponsor thereby.
 4. If, after notice of termination for failure to fulfill contract obligations, it is determined that the Contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the Sponsor. In such event, adjustment in the contract price shall be made as provided in paragraph 2 of this clause.
 5. The rights and remedies of the sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

RETURN WITH BID

11. BIDDING REQUIREMENTS AND BASIS OF AWARD. When alternates are included in the proposal, the following shall apply:

a. Additive Alternates

- (1) Bidders must submit a bid for the Base Bid and for all Additive Alternates.
- (2) Award of this contract will be made to the lowest responsible qualified bidder computed as follows:

The lowest aggregate amount of (i) the Base Bid plus (ii) any Additive Alternate(s) which the Department elects to award.

The Department may elect not to award any Additive Alternates. In that case, award will be to the lowest responsible qualified bidder of the Base Bid.

b. Optional Alternates

- (1) Bidders must submit a bid for the Base Bid and for either Alternate A or Alternate B or for both Alternate A and Alternate B.
- (2) Award of this contract will be made to the lowest responsible qualified bidder computed as follows:

The lower of the aggregate of either (i) the Base Bid plus Alternate A or (ii) the Base Bid plus Alternate B.

12. CONTRACT TIME. The Contractor shall complete all work within the specified contract time. Any calendar day extension beyond the specified contract time must be fully justified, requested by the Contractor in writing, and approved by the Engineer, or be subject to liquidated damages.

The contract time for this contract is 174 calendar days based on an anticipated notice-to-proceed date of June 9, 2008. It is the intent of the Airport Authority that the project be substantially complete by the end of the 2008 calendar year.

13. INDEPENDENT WEIGHT CHECKS. The Department reserves the right to conduct random unannounced independent weight checks on any delivery for bituminous, aggregate or other pay item for which the method of measurement for payment is based on weight. The weight checks will be accomplished by selecting, at random, a loaded truck and obtaining a loaded and empty weight on an independent scale. In addition, the department may perform random weight checks by obtaining loaded and empty truck weights on portable scales operated by department personnel.

14. GOOD FAITH COMPLIANCE. The Illinois Department of Transportation has made a good faith effort to include all statements, requirements, and other language required by federal and state law and by various offices within federal and state governments whether that language is required by law or not. If anything of this nature has been left out or if additional language etc. is later required, the bidder/contractor shall cooperate fully with the Department to modify the contract or bid documents to correct the deficiency. If the change results in increased operational costs, the Department shall reimburse the contractor for such costs as it may find to be reasonable.

RETURN WITH BID

PROPOSAL SIGNATURE SHEET

The undersigned bidder hereby makes and submits this bid on the subject Proposal, thereby assuring the Department that all requirements of the Invitation for Bids and rules of the Department have been met, that there is no misunderstanding of the requirements of paragraph 4 of this Proposal, and that the contract will be executed in accordance with the rules of the Department if an award is made on this bid.

Firm Name _____

(IF AN INDIVIDUAL)

Signature of Owner _____

Business Address _____

Firm Name _____

By _____

(IF A CO-PARTNERSHIP)

Business Address _____

Name and Address of All Members of the Firm:

Corporate Name _____

Corporate Seal

By _____

President

(IF A CORPORATION)

Attest _____

Corporate Secretary

Business Address _____

Name of Corporate Officers:

President Corporate Secretary Treasurer

NOTARY CERTIFICATION

STATE OF ILLINOIS,

ALL SIGNATURES MUST BE NOTARIZED

COUNTY OF _____

I, _____, a Notary Public in and for said county, do hereby certify that _____

_____ AND _____

(Insert names of individual(s) signing on behalf of bidder)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of the bidder, appeared before me this day in person and acknowledged that they signed, sealed, and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this _____ day of _____, A.D. _____

My commission expires _____ (Seal)

Notary Public

Item No. 3A
Letting Date: April 25, 2008

Airport: Chicago Rockford International Airport
Ill. Proj. No. RFD-3787
Fed. Proj. No. 3-17-0088-XX

KNOW ALL MEN BY THESE PRESENTS. that we, _____, as PRINCIPAL, and _____, as SURETY are held and firmly bound unto the, hereinafter called the SPONSOR, in the penal sum of 5 percent of the total bid price or of the amount specified in Section 6, PROPOSAL GUARANTEE of the Proposal Document, whichever is the lesser sum, well and truly to be paid unto the said SPONSOR, for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the PRINCIPAL has submitted a Bid Proposal to the SPONSOR through its AGENT, the State of Illinois, Department of Transportation, Division of Aeronautics, for the improvement designated by the Transportation Bulletin Item Number and Letting Date indicated above;

NOW, THEREFORE, if the SPONSOR through its AGENT shall accept the Bid Proposal of the PRINCIPAL; and if PRINCIPAL shall within the time and as specified in the Bidding and Contract Documents, submit the DBE Utilization Plan that is acceptable and approved by the AGENT, and if after the award, the PRINCIPAL shall enter into a contract in accordance with the terms of the Bidding and Contract Documents including evidence of insurance coverage's and providing such bond as specified with good and sufficient surety for the faithful performance of such contract and for prompt payment of labor and material furnished in the prosecution thereof; or if, in the event of the failure of the PRINCIPAL to make the required DBE submission or to enter into such contract and to give the specified bond, the PRINCIPAL pays to the SPONSOR the difference not to exceed the penalty hereof between the amount in the Bid Proposal and such larger amount for which the SPONSOR may contract with another party to perform the work covered by said Proposal Document, then, this obligation to be void; otherwise to remain in full force and effect.

IN THE EVENT the SPONSOR acting through its AGENT determines the PRINCIPAL has failed to comply with any requirement as set forth in the preceding paragraph, then the SURETY shall pay the penal sum to the SPONSOR within fifteen (15) days of written demand therefor. If the SURETY does not make full payment within such period of time, the AGENT may bring an action to collect the amount owed. The SURETY is liable to the SPONSOR and to the AGENT for all its expenses, including attorney's fees, incurred in any litigation in which SPONSOR or AGENT prevail either in whole or in part.

IN WITNESS WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by their respective officers this _____ day of _____ A.D., 20 ____.

PRINCIPAL	SURETY
_____	_____
(Company Name)	(Company Name)
By: _____	By: _____
(Signature & Title)	(Signature of Attorney-in-Fact)

Notary Certification for Principal and Surety

State of Illinois)
) ss:
County of _____)

I, _____, a Notary Public in and for said County, do hereby certify that _____ and _____
(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed and delivered said instrument as their free and voluntary act for uses and purposes therein set forth.

Given under my hand and notary seal this _____ day of _____ A.D., 20 ____
My commission expires _____

(Notary Public)

In lieu of completing the above section of the Proposal Bid Form, the PRINCIPAL may file an Electronic Bid Bond. By signing below, the PRINCIPAL is ensuring the identified electronic bid bond has been executed and the PRINCIPAL and SURETY are firmly bound to the SPONSOR through its AGENT under the conditions of the Bid Bond as shown above.

_____	_____	_____
Electronic Bid Bond ID#	Company/Bidder Name	Signature and Title



PROPOSALS

for construction work advertised for bids by the
Illinois Department of Transportation

Item No.	Item No.	Item No.

Submitted By:

Name:
Address:
Phone No.

Bidders should affix this form to the front of a 10" x 13" envelope and use that envelope for the submittal of bids. If proposals are mailed, they should be enclosed in a second or outer envelope addressed to:

Engineer of Design and Environment - Room 323
Illinois Department of Transportation
2300 South Dirksen Parkway
Springfield, Illinois 62764

CONTRACTOR OFFICE COPY OF CONTRACT SPECIFICATIONS

NOTICE

None of the following material needs to be returned with the bid package unless the special provisions require documentation and/or other information to be submitted.



Illinois Department of Transportation

CONTRACT REQUIREMENTS

(1) Airport Improvement Program projects. The work in this contract is included in the federal Airport Improvement Program and is being undertaken and accomplished by the Illinois Department of Transportation, Division of Aeronautics and the Municipality, hereinafter called the Co-Sponsors, in accordance with the terms and conditions of a Grant Agreement between the Co-Sponsors and the United States, under the Airport and Airway Improvement Act of 1982 (Public Law 97-248; Title V, Section 501 et seq., September 3, 1982; 96 Stat. 671; codified at 49 U.S.C Section 2201 et seq.) and Part 152 of the Federal Aviation Regulations (14 CFR Part 152), pursuant to which the United States has agreed to pay a certain percentage of the costs of the Project that are determined to be allowable Project costs under the Act. The United States is not a party to this contract and no reference in this contract to FAA or representative thereof, or to any rights granted to the FAA or any representative thereof, or the United States, by the contract, makes the United States a party to this contract.

(2) Consent of Assignment. The Contractor shall obtain the prior written consent of the Co-Sponsors to any proposed assignment of any interest in or part of this contract.

(3) Convict Labor. No convict labor may be employed under this contract.

(4) Veterans Preference. In the employment of labor, except in executive, administrative, and supervisory positions, preference shall be given to veterans of the Vietnam era and disabled veterans as defined in Section 515(c) of the Airport and Airway Improvement Act of 1982. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

(5) Withholding: Sponsor from Contractor. Whether or not payments or advances to the Co-Sponsors are withheld or suspended by the FAA, the Co-Sponsors may withhold or cause to be withheld from the Contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the Contractor or any subcontractor on the work the full amount of wages required by this contract.

(6) Nonpayment of Wages. If the Contractor or subcontractor fails to pay any laborer or mechanic employed or working on the site of the work any of the wages required by this contract the Co-Sponsors may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment or advance of funds until the violations cease.

(7) FAA Inspection and Review. The Contractor shall allow any authorized representative of the FAA to inspect and review any work or materials used in the performance of this contract.

(8) Subcontracts. The Contractor shall insert in each of his subcontracts the provisions contained in Paragraphs (1), (3), (4), (5), (6), and (7) above and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

(9) Contract Termination. A breach of Paragraph (6), (7), and (8) above may be grounds for termination of the contract.

PROVISIONS REQUIRED BY THE REGULATIONS OF THE SECRETARY OF LABOR 29 CFR 5.5

(a) Contract Provisions and Related Matters.

(1) Minimum Wages.

Revised 1/92

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provision of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraph 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii)(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140).

(ii)(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140).

(ii)(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB control number 1215-0140).

(2) Withholding. The Federal Aviation Administration shall upon its own action or written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such work, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office Management and Budget under OMB control numbers 1215-0140 and 1215-0017).

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph 5.5(a)(3)(i) of Regulations, 29 CFR Part 5. This information may be submitted in any form desired.

Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB control number 1215-0149).

(ii)(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor, or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under paragraph 5.5(a)(3)(i) of Regulations, 29 CFR Part 5 and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed as specified in the applicable wage determination incorporated into the contract.

(ii)(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(ii)(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and Trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as a apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ration permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contract will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(5) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses contained in paragraph (a)(1) through (10) of this contract and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by an subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract determination: debarment. A breach of these contract clauses paragraphs (a)(1) through (10) and the 2nd clause (b)(1) through (5) below may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by referenced in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of Eligibility.

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(b) Contract Work Hours and Safety Standards Act. The Agency Head shall cause or require the contracting officer to insert the following clauses set forth in paragraphs (b)(1), (2), (3), (4) and (5) of this section in full in AIP construction contracts in excess of \$2,000. These clauses shall be inserted in addition to the clauses required by paragraph 5.5(a) or paragraph 4.6 of Part 4 of this title. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements: No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen or guards (including apprentices and trainees described in paragraphs 5 and 6 above) shall require or permit any laborer, mechanic, watchman or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman or guard receives compensation at a rate not less than one and one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violations: Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the Contractor and any subcontractor responsible therefore shall be liable to any affected employee for his/her unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman or guard employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10.00 for each calendar day on which such employee was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. The (write in the name of the Federal agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

(5) Working Conditions. No Contractor or subcontractor may require any laborer or mechanic employed in the performance of any contract to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to his health or safety as determined under construction safety and health standards (29 CFR 1926) issued by Department of Labor.

(c) In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in paragraph 5.1, the Agency Head shall cause or require the contracting officer to insert a clause requiring that the Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Agency Head shall cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the Contractor or subcontractor will permit such representatives to interview employees during working hours on the job. (Approved by the Office of Management and Budget under OMB control numbers 1215-0140 and 1215-0017).

FEDERAL REGULATIONS VOL. 40, #74,
WEDNESDAY, APRIL 16, 1975, PAGE 17124,
ADMINISTRATION OF THE CLEAR AIR ACT
& WATER POLLUTION CONTROL ACT
(with respect to Federal Grants)

In connection with the administration of the Clean Air Act and the Water Pollution Control Act with respect to Federal Grants, specific requirements have been imposed of any contract which is not exempt under the provisions of 40 CFR 15.5.

(1) Any facility listed on the EPA List of Violating Facilities pursuant to Paragraph 15.20 of 40 CFR as of the date of the contract award will not be utilized in the performance of any non-exempt contract or subcontract.

(2) The Contractor shall comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 USC 1857 et seq. and Section 308 of the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq. relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in Section 114 and Section 308 of the Air Act and Water Act, respectively, and all regulations and guidelines issued thereunder after the award of the contract.

(3) Prompt notification shall be required prior to contract award to the awarding official by the Contractor who will receive the award of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that a facility to be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

(4) The Contractor shall include or cause to be included the criteria and requirements in paragraphs 1 through 4 in any non-exempt subcontract and will take such action as the Government may direct as a means of enforcing such provisions.

Attachment No. 1

During the performance of the contract, the Contractor agrees as follows:

- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The Contractor will, in all solicitations or advertisements for employees placed by or on the behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
- (3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or worker's representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of 24 September 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of 24 September 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.
- (7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of 24 September 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

ATTACHMENT NO. 2

EACH PRIME CONTRACTOR SHALL INSERT IN EACH SUBCONTRACT THE CERTIFICATION IN APPENDIX B, AND FURTHER, SHALL REQUIRE ITS INCLUSION IN ANY LOWER TIER SUBCONTRACT, PURCHASE ORDER, OR TRANSACTION THAT MAY IN TURN BE MADE.

- Appendix B of 49 CFR Part 29 -

This certification applies to subcontractors, material suppliers, vendors and other lower tier participants.

Appendix B--Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions

Instructions for Certification

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

STATE REQUIRED CONTRACT PROVISIONS
ALL FEDERAL-AID CONSTRUCTION CONTRACTS

Effective February 1, 1969
Revised January 2, 1973

The following provisions are State of Illinois requirements and are in addition to the Federal requirements.

"EQUAL EMPLOYMENT OPPORTUNITY"

In the event of the Contractor's noncompliance with any provisions of this Equal Employment Opportunity Clause, the Illinois Fair Employment Practices Act or the Fair Employment Practices Commission's Rules and Regulations for Public Contracts, the Contractor may be declared nonresponsible and therefore ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the contract may be canceled or avoided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

During the performance of this contract, the Contractor agrees as follows:

- (1) That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
- (2) That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (in accordance with the Commission's Rules and Regulations for Public Contracts) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
- (3) That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, national origin or ancestry.
- (4) That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts. If any such labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Fair Employment Practices Commission and the contracting agency and will recruit employees from other sources when necessary to fulfill its obligations thereunder.
- (5) That it will submit reports as required by the Illinois Fair Employment Practices Commission's Rules and Regulations for Public Contracts, furnish all relevant information as may from time to time be requested by the Commission or the contracting agency, and in all respects comply with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts.
- (6) That it will permit access to all relevant books, records, accounts and work sites by personnel of the contracting agency and the Illinois Fair Employment Practices Commission for purposes of investigation to ascertain compliance with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts.
- (7) That it will include verbatim or by reference the provisions of paragraphs 1 through 7 of this clause in every performance subcontract as defined in Section 2.10(b) of the Commission's Rules and Regulations for Public Contracts so that such provisions will be binding upon every subcontractor; and that it will also so include the provisions or paragraphs 1, 5, 6 and 7 in every supply subcontract as defined in Section 2.10(a) of the Commission's Rules and Regulations for Public Contracts so that such provisions will be binding upon every such subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by all its subcontractors; and further it will promptly notify the contracting agency and the Illinois Fair Employment Practices Commission in the event any subcontractor fails or refuses to comply therewith. In addition, no Contractor will utilize any subcontractor declared by the Commission to be nonresponsible and therefore ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

CONSTRUCTION CONTRACT PROCUREMENT POLICIES

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SECTION 1

PROPOSAL REQUIREMENTS AND CONDITIONS

1-01 ADVERTISEMENT (Notice to Bidders). The State of Illinois shall publish the advertisement at such places and at such times as are required by local law or ordinances. The published advertisement shall state the time and place for submitting sealed proposals; a description of the proposed work; instructions to bidders as to obtaining proposal forms, plans, and specifications; proposal guaranty required; and the Owner's right to reject any and all bids.

For Federally assisted contracts the advertisement shall conform to the requirements of local laws and ordinances pertaining to letting of contracts and, in addition, shall conform to the requirements of the appropriate parts of the Federal Aviation Regulations applicable to the particular contract being advertised.

1-02 PREQUALIFICATION OF BIDDERS.

- (a) When the awarding authority is the State of Illinois, each prospective bidder, prior to being considered for issuance of any proposal forms will be required to file, on forms furnished by the Department, an experience questionnaire and a confidential financial statement in accordance with the Department's Instructions for Prequalification of Contractors. The Statement shall include a complete report of the prospective bidder's financial resources and liabilities, equipment, past record and personnel, and must be submitted at least thirty (30) days prior to the scheduled opening of bids in which the Contractor is interested.

After the Department has analyzed the submitted "Contractor's Statement of Experience and Financial Condition" and related information and has determined appropriate ratings, the Department will issue to the Contractor a "Certificate of Eligibility". The Certificate will permit the Contractor to obtain proposal forms and plans for any Department of Transportation letting on work which is within the limits of the Contractor's potential as indicated on his "Certificate of Eligibility", subject to any limitations due to present work under contract or pending award as determined from the Contractor's submitted "Affidavit of Availability". Bidders intending to consistently submit proposals shall submit a "Contractor's Statement of Experience and Financial Condition" at least once a year. However, prequalification may be changed during that period upon the submission of additional favorable reports or upon reports of unsatisfactory performance.

Before a proposal is issued, the prospective bidder will be required to furnish an "Affidavit of Availability" indicating the location and amount of all uncompleted work under contract, or pending award, either as principal or subcontractor, as well as a listing of all subcontractors and value of work sublet to others. The prospective bidder may be requested to file a statement showing the amount and condition of equipment which will be available.

Before an award is made, the bidder may be required to furnish an outline of his plans for conducting the work.

- (b) When the awarding authority for contract construction work is the County Board of a county; the Council, the City Council, or the President and Board of Trustees of a city, village or town, each prospective bidder, in evidence of his competence, shall furnish the awarding authority as a prerequisite to the release of proposal forms by the awarding authority, a certified or photostatic copy of a "Certificate of Eligibility" issued by the Department of Transportation, in accordance with Section 1-02(a).

The two low bidders must file within 24 hours after the letting a sworn affidavit, in triplicate, showing all uncompleted contracts awarded to them and all low bids pending award for Federal, State, County, Municipal and private work, using the blank form made available for this affidavit. One copy shall be filed with the awarding authority and two copies with the District Highway Office.

1-03 CONTENTS OF PROPOSAL FORMS. Upon request, the Department will furnish the prequalified bidders a proposal form. This form will state the location and description of the contemplated construction and will show the estimate of the various quantities and kinds of work to be performed or materials to be furnished, and will have a schedule of items for which unit bid prices are invited. The proposal form will state the time in which work must be completed, the amount of the proposal guaranty, labor requirements, and date, time and place of the opening of proposals. The form will also include any special provisions or requirements which vary from or are not contained in these specifications.

All papers bound with or attached to the proposal form are considered a part thereof and must not be detached or altered when the proposal is submitted. Any addenda officially issued by the Department, will be considered a part of the proposal whether attached or not.

For Federally assisted contracts, the proposal shall conform to the requirements of local laws and ordinances pertaining to letting of contracts and, in addition, shall conform to the requirements of the appropriate parts of the Federal Aviation Regulations pertaining to the particular contract being let.

1-04 ISSUANCE OF PROPOSAL FORMS. The Department shall refuse to issue a proposal form for any of the following reasons:

- (a) Lack of competency and adequate machinery, plant and other equipment, as revealed by the financial statement and experience questionnaires required under Section 1-02(a).
- (b) Uncompleted work which, in the judgment of the Department, might hinder or prevent the prompt completion of additional work if awarded.
- (c) False information provided on a bidder's "Affidavit of Availability".
- (d) Failure to pay, or satisfactorily settle, all bills due for labor and material on former contracts in force at the time of issuance of proposal forms.
- (e) Failure to comply with any prequalification regulations of the Department.
- (f) Default under previous contracts.
- (g) Unsatisfactory performance record as shown by past work for the Department, judged from the standpoint of workmanship and progress.
- (h) When the Contractor is suspended from eligibility to bid at a public letting where the contract is awarded by, or require approval of, the Department.
- (i) When any agent, servant, or employee of the prospective bidder currently serves as a member, employee, or agent of a governmental body that is financially involved in the proposed work.
- (j) When any agent, servant, or employee of the prospective bidder has participated in the preparation of plans or specifications for the proposed work.

1-05 INTERPRETATION OF QUANTITIES IN BID SCHEDULE. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly or by implication agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the subsection titled ALTERATION OF WORK AND QUANTITIES of Section 20 of the Illinois Standard Specifications for Construction of Airports without in any way invalidating the unit bid prices.

1-06 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. He shall satisfy himself as to the character, quality, and quantities of work to be performed, materials to be furnished, and as to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed contract, plans, and specifications.

Boring logs, underground utilities and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which he may make or obtain from his examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

1-07 PREPARATION OF THE PROPOSAL. The bidder shall submit his proposal on the form furnished by the Department. The proposal shall be executed property, and bids shall be made for all items indicated in the proposal form, except that when alternate bids are asked, a bid on more than one alternate for each item is not required, unless otherwise provided. The bidder shall indicate, in figures, a unit price for each of the separate items called for in the proposal; he shall show the products of the respective quantities and unit prices in the column provided for that purpose, and the gross sum shown in the place indicated in the proposal shall be the summation of said products. All writing shall be with ink or typewriter, except the signature of the bidder which shall be written with ink.

If the proposal is made by an individual, his name and business address shall be shown. If made by a firm or partnership, the name and business address of each member of the firm or partnership shall be shown. If made by a corporation, the proposal shall show the names, titles, and business address of the president, secretary, and treasurer, and the seal of the corporation shall be affixed and attested by the secretary.

The proposal shall be issued to a prequalified bidder in the same name and style as the financial statement used for prequalification and shall be submitted in like manner.

1-08 REJECTION OF PROPOSALS. The Department reserves the right to reject proposals for any of the conditions in Article 1-04 or for any of the following reasons:

- (a) More than one proposal for the same work from an individual, firm, partnership, or corporation under the same or different names.
- (b) Evidence of collusion among bidders.
- (c) Unbalanced proposals in which the prices for some items are obviously out of proportion to the prices for other items.
- (d) If the proposal does not contain a unit price for each pay item listed except in the case of authorized alternate pay items or lump sum pay items.
- (e) If the proposal is other than that furnished by the Department; or if the form is altered or any part thereof is detached.
- (f) If there are omissions, erasures, alterations, unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
- (g) If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
- (h) If the proposal is not accompanied by the proper proposal guaranty.
- (i) If the proposal is prepared with other than ink or typewriter.
- (j) If the proposal is submitted in any other name other than that to whom it was issued by the Department.

1-09 PROPOSAL GUARANTY. Each Proposal shall be accompanied by either a bid bond on the Department of Transportation, Division of Aeronautics form contained in the proposal, executed by a corporate surety company satisfactory to the Department or by a bank cashier's check or a properly certified check for not less than 5 percent of the amount bid.

Bank cashier's checks, or properly certified checks accompanying proposals shall be made payable to the Treasurer, State of Illinois.

1-10 DELIVERY OF PROPOSALS. Each proposal should be submitted in a special envelope furnished by the Department. The blank spaces on the envelope shall be filled in correctly to clearly indicate its contents. When an envelope other than the special one furnished by the Department is used, it shall be of the same general size and shape and be similarly marked to clearly indicate its contents. When sent by mail, the sealed proposal shall be addressed to the Department at the address and in care of the official in whose office the bids are to be received. All proposals shall be filed prior to the time and place specified in the Notice to Bidders. Proposals received after the time for opening of bids will be returned to the bidder unopened.

1-11 WITHDRAWAL OF PROPOSALS. Permission will be given a bidder to withdraw a proposal if he makes his request in writing or by telegram before the time for opening proposals. If a proposal is withdrawn, the bidder will not be permitted to resubmit this proposal at the same letting. With the approval of the Engineer, a bidder may withdraw a proposal and substitute a new proposal prior to the time of opening bids.

1-12 PUBLIC OPENING OF PROPOSALS. Proposals will be opened and read publicly at the time and place specified in the Notice to Bidders. Bidders, their authorized agents, and other interested parties are invited to be present.

1-13 DISQUALIFICATION OF BIDDERS. A bidder shall be considered disqualified for any of the following reasons:

- (a) Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.
- (b) Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner.
- (c) If the bidder is considered to be in "default" for any reason specified in the Subsection 1-04 titled ISSUANCE OF PROPOSAL FORMS of this section.

1-14 WORKER'S COMPENSATION INSURANCE. Prior to the approval of his contract by the Division, the Contractor shall furnish to the Division certificates of insurance covering Worker's Compensation, or satisfactory evidence that this liability is otherwise taken care of in accordance with Section 4.(a) of the "Worker's Compensation Act of the State of Illinois" as amended.

SECTION 2

AWARD AND EXECUTION OF CONTRACT

2-01 CONSIDERATION OF PROPOSALS. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. In the event of a discrepancy between unit bid prices and extensions, the unit bid price shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

- (a) If the proposal is irregular as specified in the subsection titled REJECTION OF PROPOSALS of Section 1.
- (b) If the bidder is disqualified for any of the reasons specified in the subsection titled DISQUALIFICATION OF BIDDERS of Section 1.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals; waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable State and Local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise.

2-02 AWARD OF CONTRACT. The award of contract will be made within 60 calendar days after the opening of proposals to the lowest responsible and qualified bidder whose proposal complies with all the requirements prescribed. The successful bidder will be notified by letter, that his bid has been accepted, and that he has been awarded the contract.

If a contract is not awarded within 60 days after the opening of proposals, a bidder may file a written request with the Division for the withdrawal of his bid and the Division will permit such withdrawal.

For Federally assisted contracts, unless otherwise specified in this subsection, no award shall be made until the FAA has concurred in the Owner's recommendation to make such award and has approved the Owner's proposal contract to the extent that such concurrence and approval are required by Federal Regulations.

2-03 CANCELLATION OF AWARD. The Division reserves the right to cancel the award without liability to the bidder at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with the subsection titled APPROVAL OF CONTRACT of this section. The Division at the time of cancellation will return the proposal guaranty.

2-04 RETURN OF PROPOSAL GUARANTY. The proposal guaranties of all except the two lowest bidders will be returned promptly after the proposals have been checked, tabulated, and the relation of the proposals established. Proposal guaranties of the two lowest bidders will be returned as soon as the Construction Contract, Performance Bonds, and Payment Bonds of the successful bidder have been properly executed and approved.

If any other form of proposal guaranty is used, other than a bid bond, a bid bond may be substituted at the Contractor's option.

2-05 REQUIREMENT OF PERFORMANCE AND PAYMENT BONDS. The successful bidder for a contract, at the time of the execution of the contract, shall deposit with the Division separate performance and payment bonds each for the full amount of the contract. The form of the bonds shall be that furnished by the Division, and the sureties shall be acceptable to the Division.

2-06 EXECUTION OF CONTRACT. The successful bidder shall sign (execute) the Contract and shall return the signed Contract to the Owner (Sponsor) for signature (execution) and subsequently return all copies to the Division. The fully executed surety bonds specified in the subsection title REQUIREMENTS OF PERFORMANCE AND PAYMENT BONDS of this section will be forwarded to the Division within 15 days of the date mailed or otherwise delivered to the successful bidder. If the Contract and Bonds are mailed, special handling is recommended.

If the bidder to whom award is to be made is a corporation organized under the laws of a State other than Illinois, the bidder shall furnish the Division a copy of the corporation's certificate of authority to do business in the State of Illinois with the return of the executed contract and bond. Failure to furnish such evidence of a certificate of authority within the time required will be considered as just cause for the annulment of the award and the forfeiture of the proposal guaranty to the State, not as a penalty, but in payment of liquidated damages sustained as a result of such failure.

2-07 APPROVAL OF CONTRACT. Upon receipt of the contract and bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the contract to the Division for approval and execution by the Division. Delivery of the fully executed contract to the Contractor shall constitute the Department's approval to be bound by the successful bidder's proposal and the terms of the contract.

2-08 FAILURE TO EXECUTE CONTRACT. If the contract is not executed by the Division within 15 days following receipt from the bidder of the properly executed contracts and bonds, the bidder shall have the right to withdraw his bid without penalty.

Failure of the successful bidder to execute the contract and file acceptable bonds within 15 days after the contract has been mailed to him shall be just cause for the cancellation of the award and the forfeiture of the proposal guaranty which shall become the property of the State, not as a penalty, but as liquidation of damages sustained.

ILLINOIS DEPARTMENT OF TRANSPORTATION

DIVISION OF AERONAUTICS

The requirements of the following provisions written for Federally-assisted construction contracts, including all goals and timetables and affirmative action steps, shall also apply to all State-funded construction contracts awarded by the Illinois Department of Transportation.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

APPENDIX A

The following goal for female utilization in each construction craft and trade shall apply to all Contractors holding Federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goal is applicable to the Contractor's total on-site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related construction contract or subcontract.

AREA COVERED (STATEWIDE)

Goals for Women apply nationwide.

GOAL

	Goal (percent)
Female Utilization.....	... 6.9

APPENDIX B

Until further notice, the following goals for minority utilization in each construction craft and trade shall apply to all Contractors holding Federal and federally-assisted construction contracts and subcontracts in excess of \$10,000. to be performed in the respective geographical areas. The goals are applicable to the Contractor's total on-site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally-assisted or nonfederally related construction contract or subcontract.

<u>Economic Area</u>	<u>Goal (percent)</u>
056 Paducah, KY:	
Non-SMSA Counties -	5.2
IL - Hardin, Massac, Pope	
KY - Ballard, Caldwell, Calloway, Carlisle, Crittenden,	
Fulton, Graves, Hickman, Livingston, Lyon, McCracken, Marshall	

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<u>Economic Area</u>	<u>Goal (percent)</u>
080 Evansville, IN:	
Non-SMSA Counties -	3.5
IL - Edwards, Gallatin, Hamilton, Lawrence, Saline, Wabash, White	
IN - Dubois, Knox, Perry, Pike, Spencer	
KY - Hancock, Hopkins, McLean, Mublenberg, Ohio, Union, Webster	
081 Terre Haute, IN:	
Non-SMSA Counties -	2.5
IL - Clark, Crawford	
IN - Parke	
083 Chicago, IL:	
SMSA Counties:	19.6
1600 Chicago, IL -	
IL - Cook, DuPage, Kane, Lake, McHenry, Will	
3740 Kankakee, IL -	9.1
IL - Kankakee	
Non-SMSA Counties	18.4
IL - Bureau, DeKalb, Grundy, Iroquois, Kendall, LaSalle, Livingston, Putnam	
IN - Jasper, Laporte, Newton, Pulaski, Starke	
084 Champaign - Urbana, IL:	
SMSA Counties:	
1400 Champaign - Urbana - Rantoul, IL -	7.8
IL - Champaign	
Non-SMSA Counties -	4.8
IL - Coles, Cumberland, Douglas, Edgar, Ford, Piatt, Vermilion	
085 Springfield - Decatur, IL:	
SMSA Counties:	
2040 Decatur, IL -	7.6
IL - Macon	
7880 Springfield, IL -	4.5
IL - Mendard, Sangamon	
Non-SMSA Counties	4.0
IL - Cass, Christian, Dewitt, Logan, Morgan, Moultrie, Scott, Shelby	
086 Quincy, IL:	
Non-SMSA Counties	3.1
IL - Adams, Brown, Pike	
MO - Lewis, Marion, Pike, Ralls	
087 Peoria, IL:	
SMSA Counties:	
1040 Bloomington - Normal, IL -	2.5
IL - McLean	

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APPENDIX B (CONTINUED)

<u>Economic Area</u>	<u>Goal (percent)</u>
6120 Peoria, IL - IL - Peoria, Tazewell, Woodford	4.4
Non-SMSA Counties - IL - Fulton, Knox, McDonough, Marshall, Mason, Schuyler, Stark, Warren	3.3
088 Rockford, IL: SMSA Counties: 6880 Rockford, IL - IL - Boone, Winnebago	6.3
Non-SMSA Counties - IL - Lee, Ogle, Stephenson	4.6
098 Dubuque, IA: Non-SMSA Counties - IL - JoDaviess IA - Atlamakee, Clayton, Delaware, Jackson, Winnesheik WI - Crawford, Grant, Lafayette	0.5
099 Davenport, Rock Island, Moline, IA - IL: SMSA Counties: 1960 Davenport, Rock Island, Moline, IA - IL - IL - Henry, Rock Island IA - Scott	4.6
Non-SMSA Counties - IL - Carroll, Hancock, Henderson, Mercer, Whiteside IA - Clinton, DesMoines, Henry, Lee, Louisa, Muscatine MO - Clark	3.4
107 St. Louis, MO: SMSA Counties: 7040 St. Louis, MO - IL - IL - Clinton, Madison, Monroe, St. Clair MO - Franklin, Jefferson, St. Charles, St. Louis, St. Louis City	14.7
Non-SMSA Counties - IL - Alexander, Bond, Calhoun, Clay, Effingham, Fayette, Franklin, Greene, Jackson, Jasper, Jefferson, Jersey, Johnson, Macoupin, Marion, Montgomery, Perry, Pulaski, Randolph, Richland, Union, Washington, Wayne, Williamson MO - Bollinger, Butler, Cape Girardeau, Carter, Crawford, Dent, Gasconade, Iron, Lincoln, Madison, Maries, Mississippi, Montgomery, Perry, Phelps, Reynolds, Ripley, St. Francois, St. Genevieve, Scott, Stoddard, Warren, Washington, Wayne	11.4

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These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the provisions and specifications set forth in its federally assisted contracts, and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Illinois Division of Aeronautics will provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction contract and/or subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. This notification will list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is the entire State of Illinois for the goal set forth in APPENDIX A and the county or counties in which the work is located for the goals set forth in APPENDIX B.

STANDARD FEDERAL EQUAL EMPLOYMENT
OPPORTUNITY CONSTRUCTION CONTRACT
SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:
 - a) "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
 - d) "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000. the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

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3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction Contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working as such sites or in such facilities.
 - b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c) Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractors may have taken.

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- d) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
- f) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreements; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
- k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

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- p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a Contractor association, joint Contractor-union, Contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specified minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy his requirement, Contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

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ANNUAL EEO-1 REPORT TO JOINT REPORTING COMMITTEE AS REQUIRED AT

41 CFR 60-1.7(a)

Any Contractor having a Federal contract of \$50,000 or more and 50 or more employees is required to file annual compliance reports on Standard Form 100 (EEO-1) with the Joint Reporting Committee in accordance with the instructions provided with the form. The Contractor will provide a copy of such a report to the contracting agency within 30 days after the award of a contract.

The Contractor shall require its subcontractors to file an SF 100 within 30 days after award of the subcontract if (1) it is not exempt from the provisions of these regulations in accordance with 60-1.5, (2) has 50 or more employees, (3) first tier subcontractor, and (4) has a subcontract amounting to \$50,000 or more.

Subcontractors below the first tier which perform construction work at the site of construction shall be required to file such a report if (1) it is not exempt from the provisions of these regulations in accordance with 60-1.5, (2) has 50 or more employees and has a subcontract amounting to \$50,000 or more.

The SF 100 is available at the following address:

Joint Reports Committee
EEOC - Survey Division
1801 "L" Street N.W.
Washington, D.C. 20750

Phone (202) 663-4968

DISADVANTAGED BUSINESS POLICY

I. NOTICE

This proposal contains the special provision entitled "Required Disadvantaged Business Participation." Inclusion of this Special Provision in this contract satisfies the obligations of the Department of Transportation under federal law as implemented by 49 CFR 23 and under the Illinois "Minority and Female Business Enterprise Act."

II. POLICY

It is public policy that the businesses defined in 49 CFR Part 23 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with State or Federal funds. Consequently, the requirements of 49 CFR Part 23 apply to this contract.

III. OBLIGATION

The Contractor agrees to ensure that the businesses defined in 49 CFR Part 23 have the maximum opportunity to participate in the performance of this contract. In this regard, the Contractor shall take all necessary and reasonable steps, in accordance with 49 CFR Part 23, to ensure that the said businesses have the maximum opportunity to compete for and perform portions of this contract. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

The Contractor shall include the above Policy and Obligation statements of this Special Provision in every subcontract, including procurement of materials and leases of equipment.

IV. DBE/WBE CONTRACTOR FINANCE PROGRAM

On contracts where a loan has been obtained through the DBE/WBE Contractor Finance Program, the Contractor shall cooperate with the Department by making all payments due to the DBE/WBE Contractor by means of a two-payee check payable to the Lender (Bank) and the Borrower (DBE/WBE Contractor).

V. BREACH OF CONTRACT

Failure to carry out the requirements set forth above and in the Special Provision shall constitute a breach of contract and may result in termination of the contract or liquidated damages as provided in the special provision.

(Rev. 9/21/92)

State of Illinois
Department of Transportation

SPECIAL PROVISION
FOR
DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION

- I. FEDERAL OBLIGATION: The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR part 26 and listed in the DBE Directory or most recent addendum.
- II. CONTRACTOR ASSURANCE: The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor:
- The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of federally-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.
- III. OVERALL GOAL SET FOR THE DEPARTMENT: As a requirement of compliance with 49 CFR part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal is 22.77% of all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve this goal. The dollar amount paid to all approved DBE firms performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.
- IV. CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR: This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. This determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform 10.00% of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set forth in this Special Provision:
- A. The bidder documents that firmly committed DBE participation has been obtained to meet the goal; or
- B. The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

- V. DBE LOCATOR REFERENCES: Bidders may consult the DBE Directory as a reference source for DBE companies certified by the Department. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217)785-4611, or by visiting the Department's web site at www.dot.state.il.us.
- VI. BIDDING PROCEDURES: Compliance with the bidding procedures of this Special Provision is required prior to the award of the contract and the failure of the as-read low bidder to comply will render the bid nonresponsive.
- A. In order to assure the timely award of the contract, the as-read low bidder must submit a Disadvantaged Business Utilization Plan on Department form SBE 2026 within seven (7) working days after the date of letting. To meet the seven (7) day requirement, the bidder may send the Plan by certified mail or delivery service within the seven (7) working day period. If a question arises concerning the mailing date of a Plan, the mailing date will be established by the U.S. Postal Service postmark on the original certified mail receipt from the U.S. Postal Service or the receipt issued by a delivery service. It is the responsibility of the as-read low bidder to ensure that the postmark or receipt date is affixed within the seven (7) working days if the bidder intends to rely upon mailing or delivery to satisfy the submission day requirement. The Plan is to be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217) 785-1524). It is the responsibility of the bidder to obtain confirmation of telefax delivery. The Department will not accept a Utilization Plan if it does not meet the seven (7) day submittal requirement, and the bid will be declared nonresponsive. In the event the bid is declared nonresponsive due to a failure to submit a Plan or failure to comply with the bidding procedures set forth herein, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, and may deny authorization to bid the project if re-advertised for bids. The Department reserves the right to invite any other bidder to submit a Utilization Plan at any time for award consideration or to extend the time for award.
- B. The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number and telefax number of a responsible official of the bidder designated for purposes of notification of plan approval or disapproval under the procedures of this Special Provision.
- C. The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. The signatures on these forms must be original signatures. All elements of information indicated on the said form shall be provided, including but not limited to the following:
1. The name and address of each DBE to be used;
 2. A description, including pay item numbers, of the commercially useful work to be done by each DBE;
 3. The price to be paid to each DBE for the identified work specifically stating the quantity, unit price and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;
 4. A commitment statement signed by the bidder and each DBE evidencing availability and intent to perform commercially useful work on the project; and
 5. If the bidder is a joint venture comprised of DBE firms and non-DBE firms, the plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s).

D. The contract will not be awarded until the Utilization Plan submitted by the bidder is approved. The Utilization Plan will be approved by the Department if the Plan commits sufficient commercially useful DBE work performance to meet the contract goal. The Utilization Plan will not be approved by the Department if the Plan does not commit sufficient DBE performance to meet the contract goal unless the bidder documents that it made a good faith effort to meet the goal. The good faith procedures of Section VIII of this special provision apply. If the Utilization Plan is not approved because it is deficient in a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no less than a five (5) working day period in order to cure the deficiency.

VII. CALCULATING DBE PARTICIPATION: The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR part 26.55, the provisions of which govern over the summary contained herein.

A. DBE as the Contractor: 100% goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE firm does not count toward the DBE goals.

B. DBE as a joint venture Contractor: 100% goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

C. DBE as a subcontractor: 100% goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontractor in turn subcontracts to a non-DBE firm does not count toward the DBE goal.

D. DBE as a trucker: 100% goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed and insured by the DBE must be used on the contract. Credit will be given for the full value of all such DBE trucks operated using DBE employed drivers. Goal credit will be limited to the value of the reasonable fee or commission received by the DBE if trucks are leased from a non-DBE company.

E. DBE as a material supplier:

1. 60% goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
2. 100% goal credit for the cost of materials or supplies obtained from a DBE manufacturer.
3. 100% credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a regular dealer or manufacturer.

VIII. GOOD FAITH EFFORT PROCEDURES: If the bidder cannot obtain sufficient DBE commitments to meet the contract goal, the bidder must document in the Utilization Plan the good faith efforts made in the attempt to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which could reasonably be expected to obtain sufficient DBE participation. The Department will consider the quality, quantity and intensity of the kinds of efforts that the bidder has made. Mere *pro forma* efforts are not good faith efforts; rather, the bidder is expected to have taken those efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

- A. The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.
1. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.
 2. Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
 3. Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
 4. (a) Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.

(b) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable.
 5. Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.
 6. Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
 7. Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.
 8. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.
- B. If the Department determines that the Contractor has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that a good faith effort has not been made, the Department will notify the bidder of that preliminary determination by contacting the responsible company official designated in the Utilization Plan. The preliminary determination shall include a statement of reasons why good faith efforts have not been found, and may include additional good faith efforts that the bidder could take. The notification will

designate a five (5) working day period during which the bidder shall take additional efforts. The bidder is not limited by a statement of additional efforts, but may take other action beyond any stated additional efforts in order to obtain additional DBE commitments. The bidder shall submit an amended Utilization Plan if additional DBE commitments to meet the contract goal are secured. If additional DBE commitments sufficient to meet the contract goal are not secured, the bidder shall report the final good faith efforts made in the time allotted. All additional efforts taken by the bidder will be considered as part of the bidder's good faith efforts. If the bidder is not able to meet the goal after taking additional efforts, the Department will make a pre-final determination of the good faith efforts of the bidder and will notify the designated responsible company official of the reasons for an adverse determination.

- C. The bidder may request administrative reconsideration of a pre-final determination adverse to the bidder within the five (5) working days after the notification date of the determination by delivering the request to the Department of Transportation, Division of Aeronautics, 1 Langhorne Bond Drive, Capital Airport, Springfield, IL 62707-8415 (Telefax: 217-785-4533). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The pre-final determination shall become final if a request is not made and delivered. A request may provide additional written documentation and/or argument concerning the issue of whether an adequate good faith effort was made to meet the contract goal. In addition, the request shall be considered a consent by the bidder to extend the time for award. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten (10) working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid nonresponsive.

IX. CONTRACT COMPLIANCE: Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal.

- A. No amendment to the Utilization Plan may be made without prior written approval from the Division of Aeronautics. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Division of Aeronautics, 1 Langhorne Bond Drive, Capital Airport, Springfield, IL 62707-8415. Telephone number (217) 785-8514. Telefax number (217) 785-4533.
- B. All work indicated for performance by an approved DBE shall be performed, managed and supervised by the DBE executing the Participation Statement. The Contractor shall not terminate for convenience a DBE listed in the Utilization Plan and then perform the work of the terminated DBE with its own forces, those of an affiliate or those of another subcontractor, whether DBE or not, without first obtaining the written consent of the Bureau of Small Business Enterprises to amend the Utilization Plan. If a DBE listed in the Utilization Plan is terminated for reasons other than convenience, or fails to complete its work on the contract for any reason, the Contractor shall make good faith efforts to find another DBE to substitute for the terminated DBE. The good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the DBE that was terminated, but only to the extent needed to meet the contract goal or the amended contract goal. The Contractor shall notify the Division of Aeronautics of any termination for reasons other than convenience, and shall obtain approval for inclusion of the substitute DBE in the Utilization Plan. If good faith efforts following a termination of a DBE for cause are not successful, the Contractor shall contact the Division and provide a full accounting of the efforts undertaken to obtain substitute DBE participation. The Division will evaluate the good faith efforts in light of all circumstances surrounding the performance status of the contract, and determine whether the contract goal should be amended.

- C. The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. After the performance of the final item of work or delivery of material by a DBE and final payment therefor to the DBE by the Contractor, but not later than thirty (30) calendar days after payment has been made by the Department to the Contractor for such work or material without regard to any retainage withheld by the Department, the Contractor shall submit a DBE Payment Report on Department form SBE 2115 to the Division's Chief Engineer. If full and final payment has not been made to the DBE, the Report shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Plan, the Department will deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages.

- D. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

Certification of Nonsegregated Facilities - as Required by 41 CFR 60-1.8

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000.00 which are not exempt from the provisions of the Equal Opportunity clause).

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments and that that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of his certification is a violation of the Equal opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000.00 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR
CERTIFICATIONS OF NONSEGREGATED FACILITIES**

A certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000.00 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C 1001.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS
Instructions for Certification

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction" "debarred" "suspended" "ineligible" "lower tier covered transaction" "participant" "person" "primary covered transaction" "principal" "proposal" and "voluntarily excluded" as used in this clause have the meaning set out in the Definitions and Coverage sections of the rules implementing Executive Order 12540. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.
6. The prospective primary participant agrees by submitting this proposal that should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the department or agency entering into this transaction.
7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Transaction", provided by the department or agency entering into this covered transaction without modification in all lower covered transactions and in all solicitations for lower covered transactions.
8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to check the Nonprocurement List (Tel. #).
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 8 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, and
Other Responsibility Matters - Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief that it and its principals:
 - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by an Federal department or agency;
 - b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (Federal, State or Local) transaction or contract under a public transaction: violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction or destruction of records, making false statements, or receiving stolen property;
 - c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
 - d. Have not within a three-period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

CERTIFICATION REGARDING LOBBYING (Applicable to contracts in excess of \$100,000):

Certification for Contracts, Grants, Loans and Cooperative Agreements.

The undersigned bidder certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have paid or will be paid, by or behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an Officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

WORKERS' COMPENSATION INSURANCE

Prior to the execution of his construction contract by the Illinois Department of Transportation, Division of Aeronautics, hereinafter referred to as "Division", the Contractor shall furnish to the Division certificates of insurance covering Workers' Compensation, or satisfactory evidence that this liability is otherwise taken care of in accordance with Section 4.(a) of the "Workers' Compensation Act of the State of Illinois" as amended.

Such insurance, or other means of protection as herein provided, shall be kept in force until all work to be performed under the terms of the contract has been completed and accepted in accordance with the specifications, and it is hereby understood and agreed that the maintenance of such insurance or other protection, until acceptance of the work by the Division is a part of the contract. Failure to maintain such insurance, cancellation by the Industrial Commission of its approval of such other means of protection as might have been elected, or any other act which results in lack of protection under the said "Workers' Compensation Act" may be considered as a breach of the contract.

SPECIAL PROVISION FOR DOMESTIC SOURCE FOR STEEL

Control of Materials: All steel products, as defined by the Illinois Steel Products Procurement Act, incorporated into this project shall be manufactured or produced in the United States and, in addition, shall be domestically fabricated. The Contractor shall obtain from the steel producer and/or fabricator, in addition to the mill analysis, a certification that all steel products meet these domestic source requirements.

CLAUSE TO BE INCLUDED IN ALL SOLICITATIONS,
CONTRACTS, AND SUBCONTRACTS RESULTING FROM PROJECTS FUNDED UNDER THE AIP

The Contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

- a. is not owned or controlled by one or more citizens or nationals of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
- b. has not knowingly entered into any contract or subcontract for this project with a Contractor that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list.
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a Contractor or subcontractor who is unable to certify to the above. If the Contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on the said list for use on the project, the Federal Aviation Administration may direct, through the sponsor, cancellation of the contract at no cost to the Government.

Further, the Contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The Contractor may rely upon the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The Contractor shall provide immediate written notice to the sponsor if the Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide immediate written notice to the Contractor, if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct, through this sponsor, cancellation of the contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a Contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

**MINIMUM WAGES FOR FEDERAL AND FEDERALLY
ASSISTED CONSTRUCTION CONTRACTS**

This project is funded, in part, with Federal-aid funds and, as such, is subject to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Sta. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in a 29 CFR Part 1, Appendix A, as well as such additional statutes as may from time to time be enacted containing provisions for the payment of wages determined to be prevailing by the Secretary of Labor in accordance with the Davis-Bacon Act and pursuant to the provisions of 29 CFR Part 1. The prevailing rates and fringe benefits shown in the General Wage Determination Decisions issued by the U.S. Department of Labor shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

General Wage Determination Decisions, modifications and supersedes decisions thereto are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision, together with any modifications issued, must be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable DBRA Federal prevailing wage law and 29 CFR Part 5. The wage rates and fringe benefits contained in the General Wage Determination Decision shall be the minimum paid by contractors and subcontractors to laborers and mechanics.

NOTICE

The most current **General Wage Determination Decisions** (wage rates) are available on the IDOT web site. They are located on the Letting and Bidding page at <http://www.dot.state.il.us/desenv/delett.html>.

In addition, ten (10) days prior to the letting, the applicable Federal wage rates will be e-mailed to subscribers. It is recommended that all contractors subscribe to the Federal Wage Rates List or the Contractor's Packet through IDOT's subscription service.

PLEASE NOTE: if you have already subscribed to the Contractor's Packet you will automatically receive the Federal Wage Rates.

The instructions for subscribing are at <http://www.dot.state.il.us/desenv/subsc.html>.

If you have any questions concerning the wage rates, please contact IDOT's Chief Contract Official at 217-782-7806.

BITUMINOUS MATERIALS COST ADJUSTMENTS (BDE) (RETURN FORM WITH BID)

Effective: December 1, 2006

Description. For projects with at least 1200 tons of work involving applicable bituminous materials, cost adjustments will be made to provide additional compensation to the Contractor, or credit to the Department, for fluctuations in the cost of bituminous materials when optioned by the Contractor. The adjustments shall apply to permanent and temporary hot-mix asphalt (HMA) mixtures, bituminous surface treatments (cover and seal coats), and pavement preservation type surface treatments. The adjustments shall not apply to bituminous prime coats, tack coats, crack filling/sealing, or joint filling/sealing.

The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments.

Method of Adjustment. Bituminous materials cost adjustments will be computed as follows.

$$CA = (BPI_p - BPI_L \times (\%AC_v / 100)) \times Q$$

Where: CA = Cost Adjustment, \$.
BPI_p = Bituminous Price Index, as published by the Department @ <http://www.dot.il.gov/desenv/asphaltpi.html> for the month the work is performed, \$/ton.
BPI_L = Bituminous Price Index, as published by the Department @ <http://www.dot.il.gov/desenv/asphaltpi.html> for the month prior to the letting, \$/ton.
%AC_v = Percent of virgin Asphalt Cement in the Quantity being adjusted. For HMA mixtures, the % AC_v will be determined from the adjusted job mix formula. For bituminous materials applied, a performance graded or cutback asphalt will be considered to be 100% AC_v and undiluted emulsified asphalt will be considered to be 65% AC_v.
Q = Authorized construction Quantity, tons (see below).

For HMA mixtures measured in square yards: Q, tons = A x D x (G_{mb} x 46.8) / 2000. When computing adjustments for full-depth HMA pavement, separate calculations will be made for the base, leveling and surface courses to account for their different G_{mb} and % AC_v.

For bituminous materials measured in gallons: Q, tons = V x 8.33 lb/gal x SG / 2000

Where: A = Area of the HMA mixture, sq yd.
D = Depth of the HMA mixture, in.
G_{mb} = Average bulk specific gravity of the mixture, from the approved mix design.
V = Volume of the bituminous material, gal.
SG = Specific Gravity of bituminous material as shown on the bill of lading.

Basis of Payment. Bituminous materials cost adjustments may be positive or negative but will only be made when there is a difference between the BPI_L and BPI_p in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(BPI_L - BPI_p) \div BPI_L\} \times 100$$

Bituminous materials cost adjustments will be calculated for each calendar month in which applicable bituminous material is placed; and will be paid or deducted when all other contract requirements for the items of work are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Added 12/01/2006

Return With Bid

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**OPTION FOR
BITUMINOUS MATERIALS COST ADJUSTMENTS**

The bidder shall submit this completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments. After award, this form, when submitted, shall become part of the contract.

Contract No.: _____

Company Name: _____

Contractor's Option:

Is your company opting to include this special provision as part of the contract?

Yes

No

Signature: _____ **Date:** _____

Added 12/01/2006

SECTION III

SPECIAL PROVISIONS

FOR

NORTHWEST CARGO APRON AND SITEWORK - PHASE 2

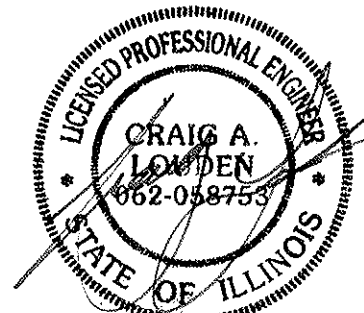
ILLINOIS PROJECT: RFD-3787
A.I.P. PROJECT: 3-17-0088-XX

AT

CHICAGO ROCKFORD INTERNATIONAL AIRPORT
ROCKFORD, ILLINOIS

FINAL SUBMITTAL

FEBRUARY 29, 2008



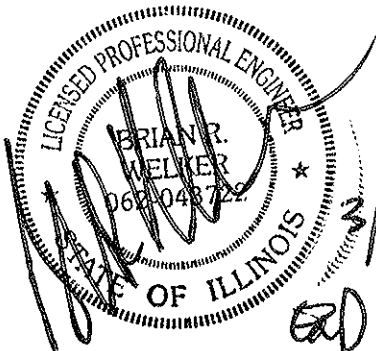
3/31/08

Exp.: 11/30/09

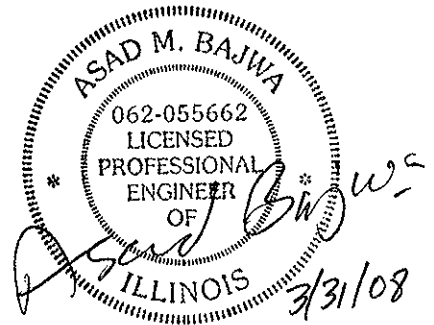
Prepared by:

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Aurora, IL 60504
www.cmtengr.com

07258-06-00



3/31/08
Exp: 11/30/09



3/31/08
Exp: 11/30/09

RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are Applicable to this contract and are included by reference:

Check
Sheet

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25	AR401655	Butt Joint Construction	295
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GENERAL

These Special Provisions, together with applicable Standard Specifications, Rules and Regulations, Contract Requirements for Airport Improvement Projects, Payroll Requirements and Minimum Wage Rates which are hereto attached or which by reference are herein incorporated, cover the requirements of the State of Illinois, Department of Transportation, Division of Aeronautics for the construction of the subject project at the Chicago Rockford International Airport, Rockford, Illinois.

GOVERNING SPECIFICATIONS AND RULES AND REGULATIONS

The "Standard Specifications for Construction of Airports", dated January 1985, State of Illinois Department of Transportation, Division of Aeronautics, the "Supplemental Specifications and Recurring Special Provisions", dated July 1, 2004, State of Illinois Department of Transportation, Division of Aeronautics, and the Interim Revisions to the Supplemental and Recurring Special Provisions, dated May 11, 2007, State of Illinois Department of Transportation, Division of Aeronautics, indicated on the Check Sheet included herein shall govern the project except as otherwise noted in these Special Provisions. In cases of conflict with any part or parts of said specifications, the said Special Provisions shall take precedence and shall govern. As noted within the Special Provisions the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction dated January 1, 2007 shall apply. City of Rockford Water Division Specifications - Revised, dated April 2, 1996 shall also apply to this improvement where appropriate. Style, type and grade of all materials used for construction shall be approved by the City of Rockford Public Works Department, City of Rockford Water Division prior to bidding, ordering or placing any materials. Rock River Water Reclamation District (RRWRD) Specifications/Code of Ordinances (latest edition) shall also apply to this improvement where appropriate. Style, type and grade of all materials used for construction shall be approved by the RRWRD prior to bidding, ordering or placing any materials.

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- 87-2 DENSITY ACCEPTANCE OF BITUMINOUS PAVEMENTS
- 87-3 MIX DESIGN, TEST BATCH, QUALITY CONTROL, AND ACCEPTANCE TESTING OF PCC PAVEMENT MIXTURE
- 90-1 RESAMPLING AND RETESTING OF PCC PAVEMENT
- 95-1 FIELD TEST PROCEDURES FOR MIXER PERFORMANCE AND CONCRETE UNIFORMITY TEST
- 96-1 ITEM 610, STRUCTURAL PORTLAND CEMENT CONCRETE: JOB MIX FORMULA APPROVAL & PRODUCTION TESTING
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- 542311 Grating for Concrete Flared End Section **(Modified)**
- 542401 Metal End Section for Pipe Culverts
- 602306 Type B Inlet **(Modified)**
- 602401-01 Manhole Type A **(Modified)**
- 602406-02 Manhole Type A 1.8m (6') Diameter **(Modified)**
- 602411 Manhole Type A 2.1m (7') Diameter **(Modified)**
- 602416 Manhole Type A 2.4m (8') Diameter **(Modified)**
- 602601-01 Precast Reinforced Concrete Flat Slab Top
- 602701-01 Manhole Steps
- 701006-02 Off-Rd Operations 2L, 2W, 15' To EOP +45 MPH
- 701901 Traffic Control Devices

DIVISION I - GENERAL PROVISIONS

SECTION 10 – DEFINITION OF TERMS

10-23 ENGINEER

DELETE:

Paragraph (b).

SECTION 20 – SCOPE OF WORK

20-05 MAINTENANCE OF TRAFFIC

ADD:

The Contractor shall be responsible for cleaning and maintaining all haul roads and use a pick-up type sweeper on all pavements and adjacent roadways utilized in hauling operations when material is tracked onto said pavement. **The Contractor shall have a sweeper on site and maintain all pavements clear of dirt and debris at all times or as requested by the Resident Engineer.**

If the Contractor fails to comply with the Standard Specifications, contract plans, or these Special Provisions concerning traffic control, the Resident Engineer shall execute such work as may be deemed necessary to correct deficiencies and the cost thereof shall be deducted from compensation due or which may become due the Contractor under the contract. The Contractor shall be responsible for supplying, maintaining and moving all barricades required for construction. The cost thereof shall not be paid for separately, but shall be considered incidental to the contract unit prices.

20-09 AIRPORT OPERATIONS DURING CONSTRUCTION

a. Construction Activity and Aircraft Movements

For construction activity to be performed in other areas than active operational areas, the storage and parking of equipment and materials, when not in use or about to be installed, shall not encroach upon active operational areas. In protecting operational areas, the minimum clearances maintained for runways shall be in conformance with Part 77 of the Federal Aviation Regulations.

All construction operations shall conform to the plans and in accordance with AC 150/5370-2 (Latest Edition) Operational Safety on Airports During Construction.

b. Limitations On Construction

(1) Open flame welding or torch cutting operations shall be prohibited, unless adequate fire and safety precautions are provided.

(2) Open trenches, excavations and stockpiled material near any pavements shall be prominently marked with red flags and lighted by light units during hours of restricted visibility and/or darkness.

(3) Stockpiled material shall be constrained in a manner to prevent movement resulting from aircraft blast or wind conditions.

(4) The use of explosives shall be prohibited.

(5) Burning shall not be allowed.

c. Debris

Waste and loose material capable of causing damage to aircraft landing gears, propellers, or being ingested in jet engines shall not be placed on active aircraft movement areas. Material tracked on these areas shall be removed continuously during the work project. The Contractor shall provide garbage cans in employee parking areas and storage areas for debris.

SECTION 30 – CONTROL OF WORK

30-03 COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS

ADD:

In the event of a conflict between the specifications in Appendix A and these special provisions, the Appendix A specifications shall govern.

30-05 COOPERATION BETWEEN CONTRACTORS

ADD:

A weekly meeting shall be scheduled during construction to discuss work areas, scheduling, etc. The superintendent for the project, the subcontractor's foremen, and the resident engineer are required to attend this meeting. The Airport and the Division may attend the meeting as necessary.

The completion of this project prior to the contract completion date is of extreme importance to the Airport. The Contractor shall update his progress schedule weekly for the scheduled progress meetings. Failure to provide updated progress schedules will result in proactive liquidated damages withheld from future pay estimates.

A materials/pre-paving meeting shall be scheduled prior to the start of paving to discuss acquisition, mixing, placing, testing, etc. The superintendent, paving foreman, batching foremen/material supplier, quality control officer, and the resident engineer are required to attend this meeting.

30-18 PLANS AND WORK DRAWINGS

DELETE: References to "approval" in first paragraph and replace with "review".

The following information shall be clearly marked on each shop, working, and layout drawing, catalog cut, pamphlet specifications sheet, etc., submitted.

PROJECT LOCATION: Greater Rockford Airport
PROJECT TITLE: Northwest Cargo Apron and Sitework - Phase 2
PROJECT NUMBERS: Illinois Project: RFD-3787
CONTRACT ITEM: (i.e. AR125110)
SUBMITTED BY: (Contractor/Subcontractor Name)
DATE: (Date Submitted)

SECTION 40 – CONTROL OF MATERIALS

40-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS

ADD after the last paragraph:

The contractor shall certify all materials incorporated into the contract. It shall be the sole responsibility of the Contractor to ensure the submittal of adequate and accurate documentation prior to the delivery of the materials.

As a guide to the certification process and requirements, the Contractor shall use the Illinois Division of Transportation/Division of Aeronautics MANUAL FOR DOCUMENTATION OF AIRPORT MATERIALS (latest edition). Copies of this manual are available from the Illinois Division of Aeronautics. Although the MANUAL OF DOCUMENTATION OF AIRPORT MATERIALS defines the Resident Engineer's/Contractor's responsibilities (Sections 300/400), the Contractor shall have the sole responsibility to provide the Resident Engineer with appropriate documentation to satisfy the contract material certification requirements prior to the delivery of materials.

40-11 REQUIRED CONTRACTOR TESTING

ADD:

The Contractor shall be required to provide all material testing and associated certification of materials as outlined in accordance with the Section 400.02 of the latest edition of the Illinois Department of Transportation, Division of Aeronautics "Manual for Documentation of Airport Materials", or as specified herein. Note any reference to testing and/or documentation being the responsibility of the Resident Engineer, Professional Engineer or Consultant shall be changed to the Contractor.

SECTION 50 – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

50-17 CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS

ADD:

Special care shall be taken on all operations to avoid damage to all underground facilities on the construction site. The approximate location of existing facilities shown on drawings will be made available to the Contractor upon request of the Resident Engineer to the extent that they are available. Any facilities which are damaged during construction and which require replacement shall be done by the Contractor at no additional cost to the Owner. Cost of replacement to be borne by the Contractor shall include any expense incurred in locating as well as repairing or replacing damaged parts of the system by the owning agency. Should the Contractor fail to respond to notification received from the Resident Engineer or his authorized representative to repair or replace damaged facilities within two hours, the Resident Engineer shall execute such work as may be deemed necessary to repair the damage, and the cost thereof shall be deducted from the compensation due or which may become due the Contractor under the contract.

It shall be the Contractor's responsibility to locate and protect all FAA owned facilities within the construction limits. **The contractor shall coordinate with the FAA personnel listed in the table below prior to locating any FAA owned facilities.**

It shall be the Contractor's responsibility to locate and protect all Airport owned facilities within the construction limits. This includes, but is not limited to, all airfield lighting cables, communication cables, storm sewer, drain tile, sanitary sewer, and water main. **The contractor shall coordinate with Airport personnel prior to locating any Airport owned facilities.**

The Contractor shall contact the following for information on utility location:

<u>Utility Service or Facility</u>	<u>Person to Contact / Emergency (Name, Title, Address & Phone)</u>	<u>Owner's Emergency Contact (Phone)</u>
Ameritech	J.U.L.I.E. (Joint Utility Locating Information for Excavators)	1-800-892-0123
Commonwealth Edison Electric Cables	J.U.L.I.E. (Joint Utility Locating Information for Excavators)	1-800-892-0123
Northern Illinois Gas	J.U.L.I.E. (Joint Utility Locating Information for Excavators)	1-800-892-0123
FAA - Airways Facilities	Airway Facilities Manager 5701 Falcon Road Rockford, Illinois 61109	1-815-484-5300
City of Rockford	Water Division	1-815-987-5700
Rock River Water Reclamation District	Sewer Division	1-815-387-7400

SECTION 60 – PROSECUTION AND PROGRESS

60-02 PROGRESS SCHEDULE

ADD:

The completion of this project prior to the contract completion date is of extreme importance to the Airport. The Contractor shall update his progress schedule weekly for the scheduled progress meetings. Failure to provide updated progress schedules will result in proactive liquidated damages withheld from future pay estimates.

60-03 NOTICE TO PROCEED

ADD:

The Notice to Proceed will not be given until all materials are certified by the Contractor to be available and on hand.

60-05 LIMITATION OF OPERATIONS

ADD:

The Contractor shall not have access to any part of the active airfield (runways or taxiways) for any equipment or personnel without approval of the Deputy Director of Operations and Maintenance. All operations shall conform to the approved phasing plan and general notes.

60-07 TEMPORARY SUSPENSION OF THE WORK

Replace references to "Resident Engineer" with "Engineer" throughout this section.

60-10 DEFAULT AND TERMINATION OF CONTRACT

Replace references to "Project Engineer" with "Engineer" throughout this section.

60-14 CONTRACTOR'S ACCESS TO AIRFIELD

The Contractor shall not have access to any part of the active airfield pavements (runways, aprons, or taxiways) for any equipment or personnel without the approval of the Airport. All access to active runway and taxiway pavements shall be coordinated with the Air Traffic Control Tower (ATCT). **Access to the referenced pavements without ATCT approval may result in a determination of an airfield incursion with associated fines.**

Unattended construction access and unauthorized access to the airfield shall be fined in accordance with the fines noted in the plans in the construction phasing notes. Gate guards shall have mobile telephone communications at all times, and shall be required to provide a daily visitor log to the airport at the weekly coordination meetings.

Gates used for Contractor access shall be padlocked using airport supplied locks. All padlocks and keys shall be issued by the airport after a \$50.00 deposit is made. Two (2) keys will be issued initially, with additional keys provided at \$3.00 / Each. Lost keys will result in fine of \$85.00, with additional costs to provide a new lock and keys.

SECTION 70 – MEASUREMENT AND PAYMENT

70-05 PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK

DELETE: Entire Section.

ADD:

Article 109.04 Payment for Extra Work from the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, Adopted January 1, 2007.

DIVISION II PAVING CONSTRUCTION DETAILS

ITEM 152 – EXCAVATION AND EMBANKMENT

(SUPPLEMENTAL SPECIFICATION)

Description

152-1.1

ADD:

All suitable material taken from excavation shall be used in formation of embankment, subgrade, and for backfilling as indicated on the plans or as directed by the Engineer. When the volume of the excavated material exceeds that required to construct the embankment to the grades indicated the excess shall be disposed of off the Airport property. When the volume of the topsoil stripping exceeds that required to construct the shoulders to the grades indicated, the excess topsoil will be stockpiled on Airport property as directed by the Resident Engineer in consultation with the Airport.

When the volume of excavation is not sufficient for construction of the fill to the grades indicated, the deficiency shall be supplied by the Contractor from offsite borrow sources. The Contractor is required to test the offsite soils and provide the Resident Engineer with the maximum dry density and optimum moisture for each offsite borrow source. All associated labor, equipment, materials and incidentals associated with obtaining the Proctor information is considered incidental to Item AR152442. The Contractor is required to submit offsite borrow sources for approval by the Engineer prior to the incorporation of the material into the project.

152-1.2 CLASSIFICATION

DELETE: Entire section

ADD:

All topsoil material excavated shall be classified as "UNCLASSIFIED EXCAVATION."

All selected material identified by the Resident Engineer to be balanced at the proposed embankment areas shall be classified as "UNCLASSIFIED EXCAVATION".

"UNCLASSIFIED EXCAVATION" shall include all excavation performed under this item regardless of the material encountered.

All material hauled to the construction site from an offsite source for embankment, shoulder fill and topsoil placement shall be classified as "OFFSITE BORROW EXCAVATION".

CONSTRUCTION METHODS

152-2.2 EXCAVATION

ADD:

Excavation and embankment shall be compacted to a density of not less than the percentage of the maximum density, at optimum moisture, shown in Table 1 as determined by the compaction control tests cited in Division VII for ASTM 1557(Modified Proctor) for aircraft weights over 60,000 pounds.

152-2.10 HAUL

ADD:

No extra claim for haul will be allowed the Contractor for any fill or excavated material to be hauled offsite.

152-2.15 DUST CONTROL WATERING

ADD:

This work shall consist exclusively of the control resulting from construction operations and is not intended for use in the compaction of earth embankment.

Dust shall be controlled by the uniform applicable of sprinkled water and shall be applied as directed by the Engineer, in a manner meeting his approval.

Dust control watering shall not be paid for separately, but shall be considered incidental to this item.

METHOD OF MEASUREMENT

152-3.2

DELETE: This section and replace with:

Dust control watering will not be measured for payment, but shall be considered incidental to the contract items for earthwork.

152-3.4

DELETE from Supplemental: This section.

BASIS OF PAYMENT

152-4.1

DELETE: These Sections.

ADD:

Payment for "UNCLASSIFIED EXCAVATION" shall also include removal of unsuitable materials, if any, at the discretion of the Engineer.

Payment will be made at the contract unit price per cubic yard measured in initial position for "UNCLASSIFIED EXCAVATION", and in its final position for "OFFISTE BORROW EXCAVATION". This price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to satisfactorily complete the items.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

152-4.2, 4.3, 4.4

Payment will be made under:

ITEM AR152410 UNCLASSIFIED EXCAVATION
ITEM AR152442 OFFSITE BORROW EXCAVATION

PER CUBIC YARD
PER CUBIC YARD

ITEM 152540 – SOIL STABILIZATION FABRIC

(CHECK SHEET #7)

CONSTRUCTION METHODS

152-3.1

REVISE FIRST PARAGRAPH:

Replace “adopted January 1, 2002” with “adopted January 1, 2007”.

BASIS OF PAYMENT

152-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR152540 SOIL STABILIZATION FABRIC PER SQUARE YARD

ITEM 201001 – BITUMINOUS BASE COURSE - METHOD 1

CHECK SHEET # 11 (DATED MAY 11, 2007)

MATERIALS

201-3.2 JOB MIX FORMULA (JMF)

Revise Table 2 to read as follows:

TABLE 2 MARSHALL DESIGN CRITERIA

	<u>OVER 60,000 lb.</u> <u>[1]</u>
Number of Blows	75
Stability (Min.)	1800
Flow	8 – 16
Percent Air Void	1.5 – 4
Voids Filled With Asphalt (%)	75 - 90

CONSTRUCTION METHODS

201-4.11 JOINTS

Add the following paragraph to this section:

At any time during the base course paving operation it becomes necessary to end a paving lane at a location other than the proposed finished pavement edge because of ending a day's paving, machinery breakdown, etc.; the lane end will be sawed back a sufficient distance to provide a smooth, neat appearing joint from which to resume paving. The sawed face will be painted with a tack coat and this work shall be considered incidental to Item 201 Bituminous Base Course, and no additional compensation will be allowed.

201-4.12 SHAPING EDGES

ADD:

All pavement edges, including the pavement ends, must be left in proper alignment as shown on the plans. This may be accomplished by a trimming method or at the Contractor's option by sawing after the paving has been completed. No additional compensation will be made if the sawing method is used.

METHOD OF MEASUREMENT

201-5.1

ADD:

Measurement for payment will not be made for any bituminous base course in excess of 103 percent of the quantity specified by the Engineer.

BASIS OF PAYMENT

201-6.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR201610 BITUMINOUS BASE COURSE PER TON

ITEM 208515 - POROUS GRANULAR EMBANKMENT

(SUPPLEMENTAL SPECIFICATION)

DESCRIPTION

208-1.1

ADD:

This work shall consist of furnishing and placing porous granular embankment as the field conditions warrant at the time of construction as directed by the Resident Engineer. This material is intended to repair soft subgrade as directed by the Resident Engineer. Excavation of the soft subgrade shall be paid for at the contract unit price for UNCLASSIFIED EXCAVATION.

MATERIALS

208-2.1 UNCRUSHED COARSE AGGREGATE

DELETE from Supplemental: Entire section.

208-2-3 GRADATION

DELETE: Entire section.

ADD:

When submitting materials for consideration, the Contractor shall provide written certification that the material meets the specified requirements. A written gradation shall also be furnished.

Gradation for Porous Granular Embankment shall be as follows:

Sieve	Percent Passing
3 inch	100
2 ½ inch	90-100
2 inch	45-75
1 ½ inch	0-30
1 inch	0-6
IDOT Gradation	CA-1

CONSTRUCTION REQUIREMENTS

208-3.3 PREPARING UNDERLYING COURSE

DELETE: Entire section.

208-3.4 METHODS OF PRODUCTION

DELETE: Entire section.

208-3.5 METHODS OF SPREADING

DELETE: Entire section.

ADD: Paragraph (D)

The porous granular embankment shall be placed in lifts no greater than one (1) foot thick or as directed by the Engineer. Rolling the top of this replacement material with a vibratory roller meeting the requirements of Section 1101 of the IDOT *Standard Specification for Road and Bridge Construction* should be sufficient to obtain the desired keying or interlock and necessary compaction. The Engineer shall verify that adequate keying has been obtained.

208-3.6 FINISHING AND COMPACTING

DELETE: Fifth sentence, first paragraph.

ADD:

The base shall be compacted to the satisfaction of the Engineer.

Capping aggregate will not be required when embankment meeting the requirements of Section 209 of the Standard Specifications or granular subbase is placed on top of the porous granular embankment. Capping aggregate (two (2) inch depth) will be required when embankment meeting the requirements of Section 152 of the Standard Specifications is placed on top of the porous granular embankment.

METHOD OF MEASUREMENT

208-4.3

ADD:

The quantity of Porous Granular Embankment shall be measured by the method of average end areas to determine the volume in cubic yards of material placed to the lines and grades shown on the plans. If required, the thickness of PGE measured for payment will include the thickness of the capping stone.

The porous granular embankment shall be used as shown and as field conditions warrant at the time of construction. No adjustment in unit price will be allowed for an increase or decrease in quantities.

BASIS OF PAYMENT

208-5.1

DELETE: Entire section.

ADD:

This work shall be paid for at the contract unit price per cubic yard for porous granular embankment, of which price shall be full compensation for the two (2) inch capping stone (if necessary), furnishing, spreading, compacting, and all incidentals related to equipment, labor and tools necessary to complete this work.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR208515 POROUS GRANULAR EMBANKMENT

PER CUBIC YARD

ITEM 209 - CRUSHED AGGREGATE BASE COURSE

(SUPPLEMENTAL SPECIFICATION)

MATERIALS

209-2.3 GRADATION

DELETE: Gradation "C" in Table 1.

CONSTRUCTION METHODS

209-3.6 FINISHING AND COMPACTING

DELETE: The Fifth sentence of the first paragraph.

ADD:

The base shall be compacted to not less than 100% of maximum density at optimum moisture as determined by compaction control tests specified in Division VII for aircraft with gross weights of 60,000 lbs and over (Modified Proctor ASTM D1557).

The Contractor shall submit copies of all density test results for each lift to the Engineer prior to acceptance testing.

METHOD OF MEASUREMENT

209-4.1

DELETE: This section

BASIS OF PAYMENT

209-5.1

DELETE: This section.

ADD:

Payment shall be made at the contract unit price per square yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials and for all preparation, hauling, placing and compacting of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR209606	CRUSHED AGG. BASE COURSE – 6"	PER SQUARE YARD
ITEM AR209608	CRUSHED AGG. BASE COURSE – 8"	PER SQUARE YARD

ITEM 401001 – BITUMINOUS SURFACE COURSE - METHOD 1

CHECK SHEET NO. 19 (DATED MAY 11, 2007)

MATERIALS

401-3.2 JOB MIX FORMULA (JMF)

Revise Table 2 to read as follows:

TABLE 2 MARSHALL DESIGN CRITERIA

	OVER 60,000 lb. (1)
Number of Blows	75
Stability (Min.)	1800
Flow	8 – 16
Percent Air Void	1.5 - 4.0
Voids Filled With Asphalt (%)	75 - 90

CONSTRUCTION METHODS

401-4.11 JOINTS

Add the following paragraph to this section:

At any time during the surface course paving operation it becomes necessary to end a paving lane at a location other than the proposed finished pavement edge because of ending a day's paving, machinery breakdown, etc.; the lane end will be sawed back a sufficient distance to provide a smooth, neat appearing joint from which to resume paving. The sawed face will be painted with a tack coat and this work shall be considered incidental to Item 401 Bituminous Surface Course, and no additional compensation will be allowed.

401-4.12 SHAPING EDGES

ADD:

All pavement edges, including the pavement ends, must be left in proper alignment as shown on the plans. This may be accomplished by a trimming method or at the Contractor's option by sawing after the paving has been completed. No additional compensation will be made if the sawing method is used.

METHOD OF MEASUREMENT

401-5.1

ADD:

Measurement for payment will not be made for any bituminous surface course in excess of 103 percent of the quantity specified by the Engineer.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR401610

BITUMINOUS SURFACE COURSE

PER TON

ITEM 401650 BITUMINOUS PAVEMENT MILLING

CHECK SHEET #24

401-1.1

ADD:

This item shall consist of bituminous pavement milling for various areas as shown on the plans. The pavement shall be removed and disposed of in accordance with these specifications and shall conform to the lines, grades, thickness and typical sections as shown on the plans or as directed by the Engineer.

The existing bituminous millings shall be placed as subgrade for the RIAT Road as specified in the plans or as directed by the Engineer. The cost of transporting, placing, grading and compacting the bituminous millings shall be paid under AR800055 BITUMINOUS MILLING PLACEMENT.

If, based on the Contractor's project sequencing, stockpiling of millings is required, no additional compensation shall be made for the stockpiling.

ADD: To the second sentence.

The type of material to be removed along with approximate typical pavement section is shown on the plans. Pavement structure information was taken from airport records, data supplied by airport personnel and soil borings. The Contractor shall verify the type and thickness of material to be removed. **No extra compensation will be allowed for any variations in the pavement sections actually encountered.**

CONSTRUCTION METHODS

401-3.1

ADD:

The existing pavement areas to be removed shall be done in such a manner as to prevent damage to the adjacent pavements. All edges adjacent to existing pavements shall be saw cut full depth prior to removal, as directed by the Engineer.

METHOD OF MEASUREMENT

401-4.1

ADD:

The area of pavement removal shall be measured by the number of square yards, satisfactorily removed and disposed of as shown on the plans or as directed by the Engineer.

If pavement or subgrade material is removed due to negligence on the part of the Contractor, the additional quantity of pavement removal and replacement of subgrade material will not be measured for payment.

BASIS OF PAYMENT

401-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR401650 BITUMINOUS PAVEMENT MILLING - PER SQUARE YARD

ITEM 401910 – REMOVE AND REPLACE BITUMINOUS PAVEMENT

DESCRIPTION

401-1.1

This item shall consist of bituminous pavement removal and replacement for patches as shown on the plans. The pavement shall be compacted in accordance with these specifications and shall conform to the lines, grades, thicknesses and typical sections as shown on the plans or as directed by the Engineer.

Each course shall be constructed to the depth, section or elevation required to match the existing pavement structure and shall be rolled, finished and approved prior to the placement of the next course.

MATERIALS

401-2.1 BITUMINOUS SURFACE COURSE

The bituminous surface course shall conform to the specifications of Section 401.

401-2.3 BITUMINOUS PRIME COAT

The bituminous prime coat shall conform to the specifications of Section 602.

401-2.4 BITUMINOUS TACK COAT

The bituminous tack coat shall conform to the specifications of Section 603.

401-2.5 CRUSHED AGGREGATE BASE COURSE

The crushed aggregate base course shall conform to the specifications of Section 209.

CONSTRUCTION METHODS

401-3.1

The type of material to be removed along with approximate typical pavement section is shown on the plans. Pavement structure information was taken from airport records, data supplied by airport personnel and soil borings. The Contractor shall verify the type and thickness of material to be removed. **No extra compensation will be allowed for any variations in the pavement sections actually encountered.**

401-3.2

The proposed pavement replacement section shall be as specified herein. Prime coat shall be applied to the aggregate base. Tack coat shall be applied between each lift of asphalt.

401-3.3

The existing pavement areas to be removed shall be done in such a manner as to prevent damage to the adjacent pavements. All edges adjacent to existing pavements shall be saw-cut full depth prior to removal, as directed by the Engineer.

401-3.4

Pavement replacement will be as detailed on the plans and constructed in accordance to the applicable Sections 209, 401, 602 & 603. The various materials required for pavement replacement shall be in accordance with the applicable portions of the Standard Specifications, Supplemental Specifications, Recurring Special Provisions and these Special Provisions. Any damage to pavement beyond the limits as shown on the plans **shall be removed and replaced by the Contractor at his expense. These areas shall be saw cut to a uniform width.**

401-3.5

Pavement removed may be used in the formation of embankment per Section 152 of the Standard Specifications or shall be disposed of off Airport property at no additional cost.

401-3.6

Pavement Removal and Replacement shall be the removal of the existing pavements as shown on the plans and the replacement pavement shall match the existing pavement bituminous surface course with 2" bituminous surface course placed as final lift. Trench backfill and/or base shall not be paid for separately but shall be considered incidental to this pay item.

METHOD OF MEASUREMENT

401-4.1

The area of pavement removal and replacement shall be measured by the number of square yards, satisfactorily removed, replaced and disposed of as shown on the plans or as directed by the Engineer.

401-4.2

If additional pavement or subgrade material is removed due to negligence on the part of the Contractor, the additional quantity of pavement removal and replacement of subgrade material will not be measured for payment.

401-4.3

The bituminous surface course, bituminous base course, bituminous prime coat and bituminous tack coat, and crushed aggregate base course will not be measured separately for payment, but will be considered incidental to REMOVE & REPLACE BIT. PAVEMENT, per square yard.

BASIS OF PAYMENT

401-5.1

Payment for REMOVE & REPLACE BIT. PAVEMENT shall be made at the contract unit price per square yard. This price shall include full compensation for sawing, removal, disposal, replacement of asphalt materials, compaction, prime coat, tack coat, including furnishing all materials, labor, tools, equipment and incidentals necessary to complete this item of work.

Any grading and recompacting of existing granular base course to proper grade shall not be paid for separately but shall be considered incidental to REMOVE & REPLACE BIT. PAVEMENT.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR401910 REMOVE & REPLACE BIT. PAVEMENT PER SQUARE YARD

ITEM 501003 – PORTLAND CEMENT CONCRETE PAVEMENT - METHOD III

CHECK SHEET #29

MATERIALS

501-2.4 PREMOLDED JOINT FILLER

REWRITE the first sentence to read:

Premolded joint filler for expansion joints shall conform to the requirements of ASTM D-1752 with compression requirement modified to 10 psi minimum and 25 psi maximum and shall be Ceramar by W.R. Meadows, or approved equivalent.

501-2.6 STEEL REINFORCEMENT

DELETE: This section.

ADD:

Reinforcement bars required at fillets and structures shall be deformed steel bar Grade 40 or 60 conforming to ASTM A-615 or ASTM A-616. Reinforcement bars designated as ASTM A-615 can be used for construction requiring bent bars. Reinforcement bars designated as ASTM A-616 can only be used if they are straight.

Reinforcement of odd-shaped panels shall be panels of welded wire fabric of the size and dimensions shown in the plans conforming to ASTM A-185.

501-2.7 DOWEL AND TIE BARS

ADD:

All dowel bars shall be fastened firmly in position with an approved contraction joint dowel bar assembly prior to the start of paving operations per article 420.05 of the IDOT Standard Specifications for Road and Bridge Construction. Loose dowel bars will not be accepted.

Contraction Joint Assembly. The contraction joint assembly shall be an approved welded assembly possessing the rigidity to hold the dowels during the placing and compacting of the concrete to the degree of alignment specified hereinafter. The assembly shall have 4 parallel spacer bars and 2 subgrade-bearing members. An upright support at each end of dowel shall be welded to both the outside spacer bar and the bearing member at appropriate points to hold the dowels at the design height. The two inside spacer bars shall be spaced approximately 2 inches on each side of center.

The dowels shall be spaced as shown on the plans and alternate ends shall be welded to the outside spacer bars. One weld is permitted per bar. The end of each dowel not welded to a spacer bar shall be securely held in place by means of wire loops or metal tubes welded to the other outside spacer bar. Suitable ties shall be provided to hold the assembly in normal position during shipping, handling and installation. Wire sized shall not be less than W7 for the outside spacer bars, bearing members and upright supports and W5 wire for the 2 inside spacer bars. The tie wires used for securing the spacer bars shall not be less than W3 wires.

The assembly shall be provided with 2 continuous bearing plates of not less than 2-inch width and not less than 0.0359 inches thickness sheet steel. The bearing plates shall be attached by welding to the subgrade members or by suitable clips and shall be punched to receive the protruding ends of the upright supports and stakes. The stakes shall be driven parallel to and next to the upright supports. The subgrade bearing members may be omitted if suitable subgrade plates are shop welded to the assembly and provide equivalent rigidity. Bearing plates will not be required on stabilized subbase.

The welds in the assembly shall be securely made. A broken weld will be sufficient cause for rejection of the length or section of the assembly in which it occurs.

501-2.9 COVER MATERIAL FOR CURING

DELETE: (b), (c) and (d).

REVISE: (a) as follows:

Curing materials shall be liquid membrane-forming compounds conforming to the requirements of ASTM C-309, Type 2 (White Pigmented).

501-2.9 COVER MATERIAL FOR CURING

DELETE: (b), (c) and (d).

REVISE: (a) as follows:

Curing materials shall be liquid membrane-forming compounds conforming to the requirements of ASTM C-309, Type 2 (White Pigmented).

CONSTRUCTION METHODS

501-3.1 EQUIPMENT

501-3.1 (d) CONCRETE SAW

ADD:

Only self-propelled, water-cooled and lubricated saws with diamond blades shall be used on this project.

501-3.1 (e) FORMS

ADD:

All radii and tapers shall be formed with flexible forms.

501-3.1 (f) SLIP-FORM PAVERS

ADD:

The guide wires for pavers shall be set with steel standards (pins) driven into the subbase. An alternate method will be standards set with weighted bases.

501-3.1 (g) DRILLING MACHINE

ADD:

The machine used for drilling the holes for dowel bars in the face of the pavement shall be capable of drilling the size and depth of holes as shown on the plans. A drill support system using the pavement surface as a reference shall be required to assure hole alignment at the specified depth of the PCC pavement. Hand-held tools will not be allowed.

501-3.2 FORM SETTING

ADD:

In the event that the pavement is constructed utilizing the formed paving technique, the paving lane forms supported by the subbase shall be anchored by steel pins. No formed areas shall be poured until the Engineer has checked and accepted the formwork for both alignment and elevation.

501-3.3 CONDITIONING OF UNDERLYING COURSE, SLIP-FORM CONSTRUCTION

DELETE: The first sentence.

ADD:

The existing grade along the outer edges of the new pavement shall be improved, if necessary, to support the paver without noticeable displacement. Any grading, compacting, or furnishing and installing materials shall be considered incidental to the unit prices for paving and no separate payment will be made.

All areas shall be constructed true to grade and acceptable to the Engineer prior to paving.

During placement of the concrete pavement, the subbase shall be maintained in a moist condition without accumulation of pools of water.

In the event that the underlying course has become over-saturated or unstable, paving operations shall stop until corrected unless otherwise approved by the Engineer.

501-3.4 CONDITIONING OF UNDERLYING COURSE, SIDE-FORM CONSTRUCTION

ADD:

All areas shall be constructed true to grade and acceptable to the Engineer prior to paving.

During placement of the concrete pavement, the subbase shall be maintained in a moist condition without accumulation of pools of water.

In the event that the underlying course has become over-saturated or unstable, paving operations shall stop until corrected unless otherwise approved by the Engineer.

501-3.6(a) PROPORTIONS

DELETE: This section.

501-3.7 FIELD TEST SPECIMENS

ADD:

The Contractor shall provide a system of marking and tracking samples taken in the field. The system shall be provided at the Preconstruction conference and shall, at a minimum, provide location of sample, lot number and curing and reporting of all test specimens manufactured by the Contractor's personnel.

The Contractor shall provide the forms or molds used to make compressive test cylinders or flexural beam specimens.

501-3.10 PLACING CONCRETE

(a) Side-Form Method

DELETE: Second paragraph.

ADD:

When concrete is to be placed adjoining a previously constructed lane of pavement and when mechanical equipment will be operated upon the existing lane of pavement, the concrete shall have a minimum flexural strength of 550 psi or compressive strength of 3500 psi. If only finishing equipment is carried on the existing lane, paving in adjoining lanes may be permitted after 3 days, if approved by the Engineer.

(b) Slip-Form Method

ADD:

In addition to the requirements of this section, the concrete shall be placed as described in the applicable sections of Section 501-3.10(a). Any equipment used for transporting concrete shall be capable of discharging the material at a minimum specified slump. Concrete that is transported in vehicles not capable of discharging concrete at a minimum specified slump is subject to rejection by the Engineer.

501-3.12 JOINTS

ADD: Paving

(a) Installation

ADD:

All joints shall be saw cut. Only diamond blade saws with water-cooling shall be used on this project. No dry sawing or inserts will be allowed. Protection of previously sawed joints from slip-form operations shall be provided in the form of rubber mats or other means acceptable to the Engineer. The Contractor shall be required to place rubber mats (or other approved material) along the pavement edge prior to drilling dowel bar holes. In addition, any damage to the pavement cause by the drilling operation shall be repaired to the satisfaction of the Engineer at no additional cost to the contract.

501-3.14 SURFACE TEXTURE

ADD:

The surface of the pavement shall be finished with a burlap drag or other approved method acceptable to the Engineer.

501-3.17 CURING

Impervious Membrane Method shall be utilized for this project.

ADD:

For slip-form paving, the approved curing media shall be applied uniformly to all surfaces of the pavement, including exposed edges. Membrane curing compounds shall be applied on all concrete surfaces from a suitable self-propelled mechanical application device, which bridges the fresh concrete, designed to provide a uniform application. Other curing systems will not be permitted.

Care shall be taken when this method of curing is used. Should conditions prevail such that curing material is being blown toward buildings or aircraft, appropriate measures shall be taken to eliminate the problems to the satisfaction of the Engineer. Two (2) separate applications, applied at least five minutes apart, each at the rate of not less than 1 gallon per 250 square feet will be required upon surfaces and edges of the concrete. Another application shall be necessary to cover any deficient areas less than 1 gallon per 125 square feet. The curing membrane shall be sprayed as soon as possible without damage to the pavement surface. Excessive delays in application of the membrane resulting in shrinkage cracking will be cause for rejection of the affected pavement necessitating removal

501-3.23 TEST SECTION FOR SLIP-FORM PAVERS

Prior to paving using the slip-form paving method, an area of the new pavements designated by the Engineer shall be paved to develop and demonstrate satisfactory procedures and concrete mix. The test section shall be located within the new pavement limits and all costs associated with the test section shall be incidental to this item.

501-3.24 GRADE CONTROL FOR SLIP-FORM PAVERS

Grade control on all free edges of slip-form pavement shall be from string lines. The use of transverse grade control from the paver will not be permitted.

501-3.25 PROTECTION OF PAVEMENT AGAINST RAIN

In order that the concrete may be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor will be required to have available at all times materials for the protection of the edges and surface of the unhardened concrete. Such protective materials shall consist of standard metal forms or wood plank having a nominal thickness of the pavement at its edge for the protection of the pavement edges, and covering material such as curing paper or polyethylene sheeting material for the protection of the surface of the pavement. The metal forms, wood planks and curing paper shall be kept on trucks or towable vehicles, within reasonable hauling distance, at a site shown on the plans, or as designated by the Engineer. Or, as an alternate, rolled polyethylene sheeting of sufficient length and width may be used without the temporary side forms and if properly anchored, to cover the plastic concrete slab and exposed edge. The sheeting may be mounted on either the paver or a separate moveable bridge from which it can be unrolled without dragging over the plastic concrete surface. When rain appears imminent, all paving operations shall stop and all available personnel shall begin covering the surface of the unhardened concrete with the protective covering. All pavement damaged shall be removed and replaced at no additional cost to the contract.

501-3.27 REMOVAL OF DEFECTIVE WORK

At locations determined by the Engineer, the contractor shall be required to remove any pavement which is classified as defective. This includes any area where non-controlled (random) cracking occurs, unacceptable surface texturing or any other defect determined unacceptable by the Engineer. The pavement shall be removed to the nearest joint and replaced at the expense of the contractor. Prior to replacement, dowels and tie bars will be provided as directed by the Engineer.

BASIS OF PAYMENT

501-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR501516	16" PCC PAVEMENT	PER SQUARE YARD
ITEM AR501530	PCC TEST BATCH	PER EACH

ITEM 501910 – REMOVE AND REPLACE PCC PAVEMENT

DESCRIPTION

501-1.1

This item shall consist of removing and replacing existing P.C.C. pavement for various utility crossings shown on the plans or as directed by the Engineer.

P.C.C. pavement replacement shall match the existing and shall consist of pavement composed of Portland Cement Concrete, or pavement composed of Portland Cement concrete with partial replacement of cement with fly ash, with or without reinforcement, constructed on a prepared subgrade, subbase or base course in accordance with these specifications and shall conform to the lines, grades, thickness and typical cross sections on the plans.

MATERIALS

501-2.1 P.C.C. REMOVAL

The material to be removed consists of P.C.C. pavement (10" ± thick). The Contractor shall verify the thickness of materials to be removed. **No extra compensation will be allowed for any variation in the pavement sections actually encountered.**

501-2.2 CRUSHED AGGREGATE BASE COURSE

The crushed aggregate base course shall conform to the specifications of Section 209.

501-2.3 P.C.C. PAVEMENT

P.C.C. Pavement shall conform to the specifications of Section 501.

CONSTRUCTION METHODS

501-3.1 GENERAL

The proposed P.C.C. replacement shall conform to the specifications of Section 501.

METHOD OF MEASUREMENT

501-4.1

PCC pavement removal and replacement shall be measured per square yard.

BASIS OF PAYMENT

501-5.1

Payment for PCC pavement removal and replacement shall be made at the contract unit price per square yard. Payment shall be full compensation for removal, disposal, reinforcing steel, compaction, testing, and all labor, materials, equipment as shown on the plans and as specified herein.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR501910 REMOVE AND REPLACE PCC PAVEMENT – PER SQUARE YARD

ITEM 510500 – TIE DOWN/GROUND ROD

CHECK SHEET #34

MATERIALS

510500-2.1

ADD:

Ground rods shall be 3/4" diameter x 10' copperweld

CONSTRUCTION METHODS

510500-3.1

ADD:

Ground rods shall be installed after PCC paving is completed. A 4" diameter hole shall be cored through the pavement. The ground rod shall be driven to 1/4" below finished pavement surface. Coring and grouting shall be considered incidental to the ground rod installation.

BASIS OF PAYMENT

510500-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR510515 GROUND ROD PER EACH

ITEM 602 - BITUMINOUS PRIME COAT

(SUPPLEMENTAL SPECIFICATION)

BASIS OF PAYMENT

602-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR602510 BITUMINOUS PRIME COAT PER GALLON

ITEM 603 - BITUMINOUS TACK COAT

(SUPPLEMENTAL SPECIFICATION)

DESCRIPTION

603-1.1

Insert the following as the second paragraph:

A tack coat shall be applied between bituminous pavement lifts. All vertical faces shall receive an application of tack coat.

CONSTRUCTION METHODS

603-3.3 APPLICATION OF BITUMINOUS MATERIAL

Add the following to the second paragraph:

Areas worn from hauling operations shall be re-tacked at no additional cost to the Contract.

BASIS OF PAYMENT

603-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR603510 BITUMINOUS TACK COAT PER GALLON

ITEM 610 - STRUCTURAL PORTLAND CEMENT CONCRETE

(SUPPLEMENTAL SPECIFICATION)

CONSTRUCTION METHODS

610-3.2 CONCRETE PROPORTIONS

Replace the last sentence of the sixth paragraph of Standard Specifications with "The air content of the concrete shall be between 5% and 8%, by volume."

BASIS OF PAYMENT

610-5.1

ADD:

No direct payment will be made for structural Portland cement concrete. The cost of furnishing and installing structural concrete shall be considered incidental to the contract unit prices for the respective pay items utilizing the concrete. These prices shall be full compensation for furnishing all materials and for all preparation, delivering and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete the item.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

ITEM 620 - PAVEMENT MARKING

(SUPPLEMENTAL SPECIFICATION)

MATERIALS

620-2.2 PAINT

ADD to Supplemental at the end of the first paragraph:

“The paint shall contain no lead, chromium, cadmium and barium.”

ADD to the end of Section 620-2.2.1 WATERBORNE:

Red and Green Paint shall conform to Federal Specification TT-P-1952D, Type 1.

CONSTRUCTION METHODS

620-3.7 PAVEMENT MARKING REMOVAL

ADD to Supplemental at the end of the paragraph:

Pavement Marking Removal shall be vacuumed and cleaned according to the IDOT Bureau of Design and Environment Special Provision “Water Blaster with Vacuum Recovery” #80163.

METHOD OF MEASUREMENT

620-4.1

ADD to Supplemental:

The quantity of permanent markings to be paid for shall be the number of square feet of painting with the specified material **measured only once to apply two coats** in conformance with the specifications and accepted by the Resident Engineer. Quantities will not be distinguished between white, yellow, blue, red and green colors of paint. Black paint shall be measured separately. The dimensions measured for the proposed pavement marking shall be limited to the dimensions of the white, yellow and black paint.

BASIS OF PAYMENT

620-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR620520	PAVEMENT MARKING – WATERBORNE	PER SQUARE FOOT
ITEM AR620525	PAVEMENT MARKING – BLACK BORDER	PER SQUARE FOOT
ITEM AR620900	PAVEMENT MARKING REMOVAL	PER SQUARE FOOT

DIVISION III – FENCING

ITEM 162 – CHAIN LINK FENCES

(SUPPLEMENTAL SPECIFICATION)

DESCRIPTION

162-1.1

ADD:

This item shall include the following:

- Installation of permanent 10 foot high fencing with three strands of barbed wire, green vinyl coating and concrete footings.
- Installation of permanent and temporary 10 foot high, 20 foot wide double swing gates with three strands of barbed wire and vinyl coating and footings as shown on the plans.
- Relocation of existing 10 foot high fencing with three strands of barbed wire and “push-in” footings.
- Removal of existing 6 foot high fencing with three strands of barbed wire and concrete footings.

The color of the vinyl coating shall be dark green and shall meet the approval of the airport.

MATERIALS

162-2.1 FABRIC

DELETE from Supplemental: This section and REPLACE with:

Rewrite paragraph (a) (1) as follows:

Change “AASHTO M181, Type I, Class B” to “AASHTO M181, Type I, Class D”

The chain link fence shall be zinc coated steel fabric.

Rewrite paragraph (a) (3) as follows:

Vinyl coated fabric shall conform to the requirements of AASHTO M181, Type IV, Class B (polyvinyl chloride (PVC)-coated steel). All non-aluminum material shall be galvanized prior to vinyl coating.

162-2.3 FENCE POSTS, POST TOPS AND EXTENSIONS, RAIL, GATES, BRACES, STRETCHER BARS AND CLIPS

ADD:

When Vinyl-coated fabric is used, the posts, fence framework, gates, tension wire, fabric ties and fittings shall be vinyl-coated according to the same requirements as the coating of the fabric. All non-aluminum material shall be galvanized prior to vinyl coating.

162-2.4 WIRE TIES AND TENSION WIRE

ADD:

Coiled spring tension wire of at least 7 gage O.D. steel wire shall be stretched along the bottom of the fence and securely fastened to the fabric with hog rings at 2-foot intervals. Fabric ties shall not be less than a 9-gauge galvanized steel wire.

When Vinyl-coated fabric is used, the posts, fence framework, gates, tension wire, fabric ties and fittings shall be vinyl-coated according to the same requirements as the coating of the fabric. All non-aluminum material shall be galvanized prior to vinyl coating

162-2.8 SIGNS

Revise the first paragraph to the following:

The Contractor shall provide and install Restricted Area signage as shown on the plans. Sign panels shall be placed on all new fencing and the slide gates. The signs shall be placed at 100-foot intervals. One (1) will be placed on each slide gate. The sign shall be red letters on white background with a red border and shall read 'RESTRICTED/AREA/KEEP OUT' (three separate lines). The letters shall be a minimum of 2½" in height. The sign materials shall conform to Type 1 sign panels as specified in Section 720 of the IDOT Standard Specifications for Road and Bridge Construction.

162-2.9 CERTIFICATION AND SHOP DRAWINGS

The Contractor shall provide written certification that all materials meet specification requirements prior to start of the work.

Shop drawings shall be submitted to the Engineer for review prior to the construction of fence and gate.

CONSTRUCTION METHODS

162-3.10 FENCE AND GATE REMOVAL

ADD:

Removal shall include refilling/compacting fence and gate holes with crushed aggregate base or sand and 4 inch topsoil to match existing ground.

162-3.11 FENCE AND GATE RELOCATION

ADD:

Removal shall include refilling/compacting fence and gate holes with crushed aggregate base or sand and 4 inch topsoil to match existing ground.

BASIS OF PAYMENT

162-5.1

ADD:

Sign panels as shown on the fencing details shall not be paid for separately but shall be incidental to the fence and gate.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall be not included on the Construction Progress Payment report until such submittals have been furnished. Payment will be made under:

ITEM AR162410	CLASS E FENCE, VINYL – 10'	PER LINEAR FOOT
ITEM AR162620	CLASS E GATE – 20'	PER EACH
ITEM AR162900	REMOVE CLASS E FENCE	PER LINEAR FOOT
ITEM AR162960	RELOCATE CLASS E FENCE	PER LINEAR FOOT

DIVISION IV - DRAINAGE PIPE

ITEM 701 – PIPE FOR STORM SEWERS AND CULVERTS

(SUPPLEMENTAL SPECIFICATION)

MATERIALS

701-2.1 GENERAL

DELETE: Entire Section

ADD:

Pipe and pipe elbows shall be of the type and diameter indicated and installed at the locations shown on the plans. Pipe for storm sewers and storm sewer elbows shall be concrete storm sewer pipe Class IV reinforced concrete conforming to ASTM C-76 (with joints meeting ASTM C-361) unless otherwise called out in the plans.

PVC storm sewer shall be ASTM D3034, SDR 35.

Corrugated metal pipe shall conform to ASTM A-760 per Section 542 of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction dated January 1, 2007 unless otherwise called out in the plans. All pipe shall be Type 1.

701-2.7 CENTRIFUGALLY CAST FIBERGLASS REINFORCED POLYMER MORTAR PIPE

ADD:

CCFRPMP shall be manufactured by Hobas or approved equal and shall be Stiffness Class SN72. Joints shall be FWC-10 couplings meeting the requirements of ASTM D-4161. CCFRPMP shall be connected to proposed manholes using A-lok gaskets (or approved equal).

CONSTRUCTION METHODS

701-3.11 PIPE REMOVAL

DELETE this section.

ADD:

This work shall consist of removal of existing pipe of various types and sizes. Trenches resulting from pipe removal under existing, proposed and/or future pavement shall be backfilled and compacted according to Section 701-3.7. Trenches outside of pavement limits shall be backfilled and compacted in accordance with Item 152, Excavation and Embankment. Pipe shall be disposed of by the Contractor off Airport property.

701-3.13 FARM FIELD TILES

ADD:

All farm field tiles encountered during the construction must be protected, replaced, or connected to the proposed storm sewers and culverts, as directed by the Engineer. Protection, replacement, and connection of farm field tiles will not be measured for payment, but shall be considered incidental to the associated item.

701-3.14 CENTRIFUGALLY CAST FIBERGLASS REINFORCED POLYMER MORTAR PIPE

ADD:

The installation of pipe and fittings shall be in accordance with the project plans and specs and the manufacturer's requirements. Do not exceed forces recommended by the manufacturer for joining or pushing pipe.

BASIS OF PAYMENT

701-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR701006	6" PVC STORM SEWER	PER LINEAR FOOT
ITEM AR701224	24" CMP	PER LINEAR FOOT
ITEM AR701512	12" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701518	18" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701524	24" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701530	30" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701536	36" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701542	42" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701548	48" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701572	72" RCP, CLASS IV	PER LINEAR FOOT
ITEM AR701900	REMOVE PIPE	PER LINEAR FOOT
ITEM AR800002	48" CCFRMP	PER LINEAR FOOT
ITEM AR800004	72" RCCP ELBOW	PER EACH

ITEM 705 – PIPE UNDERDRAINS FOR AIRPORTS

(SUPPLEMENTAL SPECIFICATION)

705-3.10 UNDERDRAIN AND UNDERDRAIN CLEANOUT REMOVAL

This work shall consist of removal of existing underdrain pipes and underdrain cleanouts of various types and sizes. Trenches resulting from underdrain removal shall be backfilled and compacted in accordance with Section 701-3.3 and 701-3.7 for areas under proposed pavements. Pipe and cleanouts shall be disposed of off airport property.

Trench backfill of removal items shall be incidental to the removal item.

BASIS OF PAYMENT

705-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

ITEM AR705900	REMOVE UNDERDRAIN	PER LINEAR FOOT
ITEM AR705904	REMOVE UNDERDRAIN CLEANOUT	PER EACH

ITEM 751 – MANHOLES, CATCH BASINS, INLETS, AND INSPECTION HOLES

(SUPPLEMENTAL SPECIFICATION)

DESCRIPTION

751-1.1

ADD:

Specifically, this item consists of the construction of inlets, manholes as shown on the plans or as directed by the Engineer.

Manholes with 5' diameters shall conform to IDOT Standard 602401-01 as modified. Manholes shall also conform to IDOT Standard 602601-01 and 602701-01. Manholes with 6', 7', and 8' diameters shall conform to IDOT Standards 602406-02, 602411 and 602416 respectively as modified.

Trench drains shall be cast-in-place and shall conform to the details shown on the construction plans. Box manholes shall be cast-in-place and shall conform to the details shown on the construction plans.

See drainage sewer schedule shown on the plans for frame and grate sizes and types.

MATERIALS

751-2.6 FRAMES, COVERS AND GRATES

ADD:

Neenah R-3492-CG, frames and grates shall be extra heavy duty with locking device, or approved equal.

CONSTRUCTION METHODS

751-3.7 PLACEMENT AND TREATMENT OF CASTING, FRAMES, AND FITTINGS

ADD:

All adjustments to bring the casting and frames to true grade shall be done with precast rings. All adjusting rings must be mortared together and must be mortared to the casting, as well as to the cone section or flat top of the structure. The maximum height of adjusting rings shall be eight (8) inches. The maximum number of rings in any structure is three (3). This may require the Contractor to remove existing rings and replace with larger rings.

Castings placed on concrete shall be set in full mortar beds. Castings shall be set to the finished pavement elevation so no subsequent adjustment will be necessary. Lifting devices will be approved by the Engineer.

The Contractor shall be responsible for field checking existing storm sewer, sanitary sewer, and electrical manhole configurations for the necessary adjustments.

751-3.9 BACKFILLING

REVISE Supplemental Specifications to read as follows:

Backfill material shall be an approved IDOT Division of Highways gradation CA-10 or CA-06 conforming to the material requirements of Item 208.

751-3.11 DEWATERING

The Contractor shall, at all times, provide and maintain in operation pumping and/or well point equipment for the complete dewatering of the excavation. No structure shall be permitted to be constructed in an excavated area in which any amount of water flows or is pooled. The cost of dewatering shall be included in the unit price of the structure.

751-3.12 INLET / MANHOLE REMOVAL

This work shall consist of the removal of existing concrete drainage inlets and manholes of various types and sizes. Trenches resulting from the manhole removals shall be backfilled and compacted in accordance with P-152, Excavation and Embankment for areas in proposed turf or backfilled and compacted in accordance with Section 701-2.7 and 701-3.7 for areas under proposed or future pavements. Manholes and inlets shall be disposed of by the Contractor off Airport property.

Trench backfill of removal items shall be incidental to the removal item.

BASIS OF PAYMENT

751-5.1

ADD:

The accepted quantities for new manholes, inlets, adjusted manholes and removals will be paid for at the contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, removal, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures may be required to complete the item as shown on the plans.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR751001	TRENCH DRAIN	PER LINEAR FOOT
ITEM AR751412	INLET – TYPE B	PER EACH
ITEM AR751550	MANHOLE 5’	PER EACH
ITEM AR751560	MANHOLE 6’	PER EACH
ITEM AR751567	MANHOLE 7’	PER EACH
ITEM AR751568	MANHOLE 8’	PER EACH
ITEM AR751903	REMOVE MANHOLE	PER EACH
ITEM AR800072	12’ X 12’ BOX MANHOLE	PER EACH
ITEM AR800073	7’ X 12’ BOX MANHOLE	PER EACH
ITEM AR800090	7’ X 15.5’ BOX MANHOLE	PER EACH

ITEM 752 – CONCRETE CULVERTS, HEADWALLS AND MISC. DRAINAGE STRUCTURES

(SUPPLEMENTAL SPECIFICATION)

DESCRIPTION

752-1.1

ADD:

Specifically, this item shall consist of metal end sections and precast reinforced concrete flared end sections with grates at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the Engineer.

This item shall also consist of the installation of metal end sections per IDOT Standard Detail 542401 and in accordance with these specifications at the locations shown in the plans.

MATERIALS

752-2.2 FLARED END SECTION

The proposed flared end section shall be reinforced concrete conforming to the ASTM Designation C-76, Class IV Pipe, and shall be constructed according to IDOT Standard 542301-01, and the Grating for the flared end section shall conform to IDOT Standard 542311 as modified.

752-2.3 METAL END SECTION

The steel end sections base metal, rivets and spelter coating shall conform to AASHTO M 36M and constructed according to IDOT Standard 542401.

BASIS OF PAYMENT

752-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be under:

ITEM AR752224	METAL END SECTION 24"	PER EACH
ITEM AR752412	PRECAST REINFORCED CONC. FES 12"	PER EACH
ITEM AR752472	PRECAST REINFORCED CONC. FES 72"	PER EACH
ITEM AR752512	GRATING FOR CONC. FES 12"	PER EACH
ITEM AR752572	GRATING FOR CONC. FES 72"	PER EACH
ITEM AR752900	REMOVE END SECTION	PER EACH

DIVISION V - TURFING

ITEM 901 – SEEDING

(SUPPLEMENTAL SPECIFICATION)

DESCRIPTION

901-1.1

REVISE: This section to read:

This item shall consist of seeding and fertilizing the proposed grading areas adjacent to the proposed pavements, miscellaneous grading areas and any area disturbed as a result of the Contractor's operations.

MATERIALS

901-2.1 SEED

REVISE: The second sentence in the second paragraph in the Standard Specifications to read:
The Contractor shall furnish the Resident Engineer duplicate signed copies of a statement by a recognized laboratory for seed testing within one year of the date of delivery.

DELETE: The seed mix table.

ADD:

The seed mixtures shall be as follows:

SEEDING MIXTURE	
<u>SEEDS</u>	<u>LBS/ACRE</u>
Alta Fescue	120
Perennial Ryegrass	40
Dawson Red Fescue	40
Scaldis Hard Fescue	40
Fults Salt Grass (note 1)	120
TOTAL	360

Note 1: Fults Pucinnellia Distans.

Alternate seed mixtures may be submitted for consideration by the Engineer.

CONSTRUCTION METHODS

901-3.2 DRY APPLICATION METHOD

DELETE: Entire Section

ADD:

- (a) Description: This work shall consist of furnishing, transporting and installing all seeds, plant or other materials required for:
 1. Any remedial operations in conformance with the plans as specified in these special provisions or as directed by the Engineer.
- (b) General Requirements: The site will be in the following condition:
 1. The grade will be shaped to the elevation shown on the plans.
 2. The topsoil will be free of clods, stones, roots, sticks, rivulets, gullies, crusting, caking and have a soil particle size of no larger than 1".
- (c) Seeding Equipment: Seeding equipment shall meet the following requirements. Any other equipment deemed necessary shall be subject to the approval of the Engineer.
 1. Disc: Any disc new for the use shall be in a good state of repair with sound, unbroken blades. The disc shall be weighted if necessary to achieve the required tillage depth.
 2. No-Till Planters and Drills: Rangeland type drills and no-till planters shall be designed specifically for the seeding of native grasses and forbs with depth control bands set at 1/4" - 1/8".
 3. Seedbed Preparation: Seedbed preparation methods shall be approved by the Engineer. Cultivation shall be accomplished at such a time that seeding may occur immediately and without delay. No seeds shall be sown until the Seedbed has been approved by the Engineer.
- (d) Seeding Methods: The Contractor shall submit for approval by the Engineer and schedule for seeding and/or planting at least two weeks prior to the scheduled commencement of work. Broadcast seeders will not be allowed. Seeder will be a drill type planter. The Engineer shall examine and then approve any equipment to be used. Prior to starting work, all seeding equipment shall be calibrated and adjusted to sow seeds at the proper seeding rate. Equipment shall be operated in a manner to insure complete coverage of the entire area to be seeded. The Engineer shall be notified 48 hours prior to beginning the seeding operations. Any gaps between areas of growth greater than eight square feet shall be resown and/or replanted.
 1. No-till or Drill Method: Rolling of the Seedbed will not be required with the use of rangeland type grass drill or no-till planters.

METHOD OF MEASUREMENT

901-4.1

ADD:

Areas of seeding not showing a uniform stand of grass in density and color shall not be approved for payment. Such areas shall be reseeded to the Owner's satisfaction at the Contractor's cost.

BASIS OF PAYMENT

901-5.1

ADD:

If upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR901510 SEEDING

PER ACRE

ITEM 905 – TOPSOILING

(SUPPLEMENTAL SPECIFICATION)

METHOD OF MEASUREMENT

905-4.1

ADD:

The yardage of topsoil obtained from onsite excavation operations shall not be measured for payment but will be considered incidental to Unclassified Excavation.

BASIS OF PAYMENT

905-5.1

If upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

ITEM 908 – MULCHING
(SUPPLEMENTAL SPECIFICATION)

DESCRIPTION

908-1.1

ADD:

Mulch shall be placed as designated on the plans.

MATERIALS

908-2.1 MULCH MATERIAL

REVISE: The first sentence to read:

Material used for mulching shall be Manufactured Hydraulic Mulch.

BASIS OF PAYMENT

908-5.1

ADD:

If upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR908510 MULCHING PER ACRE

DIVISION VI - LIGHTING INSTALLATION

ITEM 106 – APRON LIGHTING

EQUIPMENT AND MATERIALS

106-2.1 APRON FLOODLIGHT

ADD:

Luminaire shall be installed on a cast aluminum fully adjustable swivel knuckle with a fully enclosed integral junction box.

The luminaire shall be provided with a high-performance reflector with a specialized internal airport louver. A certified independent testing laboratory report shall be provided. Reflector performance shall be as follows: IES NEMA type 6H x 2V, with a Field Efficiency of 43.2 % and a Total Efficiency of 74.0 %. Key Candela Tabulation point shall be as follows:

0% vert. 0% horz. = 365240, 4% vert. 0% horz. = 147380, 10% vert. 0% horz. = 25760, 0% vert. 30% horz. = 242880, 4% vert. 30% horz. = 142730, 10% vert. 30% horz. = 23900, 0% vert. 50% horz. = 39560, 4% vert. 50% horz. = 32530, 10% vert. 50% horz. = 21650 candelas.

All CWA ballast (+10% to -10% lamp power regulation) shall be tray mounted and supplied with quick-disconnects. Ballast shall be rated for -20 degrees F operation.

The lighting has been designed for Uniformity and Glare-Control as well as for intensity. An IES format photometric file for each fixture type and an Independent Testing Laboratory certified hard copy shall be provided with the submittals for verification of lighting requirements.

Luminaires shall be Quality Lighting with the Model APL-22-K-F-HPS-1000-480-DBZ or approved equal.

106-2.2 APRON LIGHT POLES

ADD:

The pole shaft shall be designed for the combined effective projected area (EPA) and weight of the fixtures and head-frame assembly. The pole shall be analyzed in its final deflected position to account for secondary moments caused by eccentric dead loads. The calculations shall include a pole, base plate and anchor bolt analysis. The pole calculations shall be analyzed at the pole base, 5' pole intervals, and at each slip joint splice. At each of these locations, the following information shall be provided:

1. The pole shafts diameter, thickness, section modulus, moment of inertia, and cross sectional area.
2. The centroid, weight, projected area, drag coefficient, velocity pressure, and wind force of each trapezoidal pole segment.
3. The structures axial force, shear force, primary moment, total moment, axial stress, bending stress, allowable axial stress, allowable bending stress, and combined stress ratio (CSR) at each elevation.
4. The pole's angular and linear deflection at each elevation.

Calculations shall include an inherent summary page of applicable information pertaining to the design of concrete foundations. The summary page shall include, at a minimum, the total base moment, axial force, shear force, anchor bolt size and quantity, base plate size, and minimum and maximum bolt projections above the footing.

Each individual calculation page must include the project name, date, and manufacturing company information. Failure to comply will result in submittal rejection.

Wind velocities of 100-Mph w/1.3 applicable gust factor will be utilized for design purposes. The structural design criteria shall comply with the requirements of the most recent edition of AASHTO (American Association of State Highway Transportation Officials) specifications.

Each section of the pole shaft shall be of single ply material, and be made from a single sheet of steel with no circumferential welded splices.

Pole shaft shall be hot dip galvanized in accordance with the requirements of ASTM A123 specifications and then finish with a powder coat finish. Each shaft assembly shall be completely coated, inside and out, in a single dip. Double dipping will not be permitted. All connecting hardware shall be galvanized in accordance with ASTM A153 specifications. Powder Coat Finish as directed by Owners Representative. Welding shall be in accordance with AWS (American Welding Society) Structural Welding Code's most recent edition. Welders certified in accordance with the AWS code shall perform all welding. Welds shall be free of cracks and undercutting, and will be 100% visually inspected with questionable areas inspected by magnetic particle non-destructive process.

106-2.4 LIGHT POLE FOUNDATIONS

ADD:

Shaft liner shall conform to ASTM A615 Grade 1 (minimum) of diameter required to construct light pole foundations to the diameter shown on the plans.

Reinforcement for concrete shall be as shown on the drawings and shall conform to Item 610 of the standard specifications.

Concrete for light pole foundations shall have 14-day compressive strength of 3,500 PSI and shall meet the quality requirements specified in Item 610 of the standard specifications.

106-2.6 GROUND RODS

Delete the entire section and replace with the following:

All light poles shall be furnished with a ground rod as detailed in the plans. The proposed ground rods shall be 1" diameter, 15' long copper clad. The top of the rod shall be buried min. 12" below finished grade. All the connections to the ground rods shall be one shot exothermic welding as manufactured by Cadweld or equal.

106-2.7 OBSTRUCTION LIGHT

The proposed obstruction light shall be FAA L-810 L.E.D. type as manufactured by Dialight or approved equal. The obstruction light shall be mounted on a 1" GRS conduit at top of the apron light pole. It shall operate on 120 VAC.

106-2.8 GFCI RECEPTACLE

An externally assessable Dual 120V GFI with cover shall be mounted at the base of the pole.

106-2.9 CUT-OUT SWITCH

Two externally mounted circuit cut-out switches shall be provided for each light pole.

106-2.10 BASE PLATES

Base plates shall conform to ASTM A36, or ASTM A42. Plates shall be integrally welded to the bottom pole shaft section with either a telescopic welded joint or back-up-bar joint configuration. If telescoped, both external and internal lap joints shall be welded complete.

106-2.11 ANCHOR BOLTS

Foundations will be poured concrete footings with incorporation of an anchor bolt to base plate attachment system. The following anchor bolt material will be acceptable.

1. Material for anchor bolts shall be ASTM F1554, Grade 55. The bolts shall have a minimum of 10" of thread and be galvanized to ASTM A153 for a minimum of 12" on the threaded end. Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts. Anchor bolts shall be finished with a "hooked" end on the embedded portion to assist in the development of pull-out-strength from the foundation.
2. The light pole anchor bolts embedded in the pole foundation shall be designed and supplied by the light pole manufacturer. Pole manufacturer shall provide bolt circle template, one for each pole/foundation. The threaded portion of the rod shall be hot dipped galvanized. Anchor bolts and templates must be readily available for pre-shipment.

106-2.18 GROUND ROD

The proposed Apron lighting system shall be grounded to a ground rod as detailed in the plans.

CONSTRUCTION METHODS

106-3.3 LIGHT POLE FOUNDATIONS

Delete entire section and replace with the following:

Light pole foundations shall be of the types, diameters and lengths shown on the drawings. The foundation for the light poles shall be drilled to the depth and diameter shown on the drawings.

The shafts of the light pole foundation shall be case or lined to overcome unsuitable soil conditions and permit removal of water. Casings or linings shall be withdrawn as explained below. The work shall be performed in a manner that will confine disturbance of surrounding materials to a minimum. The completed light pole foundation shall receive full lateral support from the surrounding materials.

The top part of the light pole foundation which projects above grade shall be formed to the diameter shown on the plans and concrete shall be placed in the forms at the same time the lower part of the light pole foundation is filled with concrete.

The center of any light pole foundation, measured at any horizontal plane, will be allowed a tolerance from true plumb of not more than 1% of the depth of such lane. Plumb lines shall be suspended from center points at tops of shafts and any divergence above allowable tolerance shall be corrected.

Concrete for the light pole foundation shall be mixed, placed and cured in accordance with item 610 of the standard specifications, and shall be placed in a manner that will prevent separation of its constituent materials. Drop chutes or tremies shall be used to prevent concrete from striking walls. Concrete shall be poured continuously from bottom to top of light pole foundation. The concrete shall form a solid homogenous mass free from voids and an excessive amount of water. No construction joints will be permitted.

Protective casing used to prevent cave-ins and to seal off ground water shall be withdrawn only as the shaft is filled with concrete. Ahead of concrete adequate to balance outside soil or water pressure (but not less than 5 feet) must be maintained above the bottom of the casing at all times during withdrawal. Where casing is removed during replacement of concrete, the concrete shall have a slump between 4 and 6 inches. These precautions will minimize adhesion of the concrete to the sides of the casing and will prevent arching of the concrete during casing withdrawal. Any dewatering efforts necessary to properly construct the light pole foundations shall be considered incidental to this foundation item.

The foundation details shown on the drawings are based on specific assumptions regarding the poles and luminaires to be installed and subsurface conditions. Material changes to these items in terms of dimension, number of luminaires, other characteristics and subsurface conditions from the basic assumptions may require modification to the foundation design. The contractor shall notify the Resident Engineer of any changes prior to construction foundations, who will then coordinate any modifications to the foundation design with the engineer and owner.

106-3.5 PHOTOCCELL

Contractor shall shade the photocell from surrounding lights.

METHOD OF MEASUREMENT

106-4.1

ADD:

The light pole foundations will not be measured separately, it shall be included in the pay item for each apron light pole. Light pole foundation shall also consist of ground rods, anchor bolts and any miscellaneous items such as, dewatering efforts and protection, required to complete this item.

BASIS OF PAYMENT

106-5.2

If upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under the following:

ITEM AR106504	APRON LIGHT POLE W/ QUAD FIXTURE	PER EACH
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ITEM 108 - INSTALLATION OF UNDERGROUND CABLE FOR AIRPORTS

DESCRIPTION

108-1.1

ADD:

This item of work shall consist of the underground installation of 600V and 5000V cables in unit duct or conduit. A marking tape shall be placed above all cables being installed. When crossing existing circuits or as requested by the Engineer, the Contractor shall hand dig the trenches for the proposed cable.

The hand digging and trenching of this cable will be considered incidental to the contract unit price of the proposed cable and no additional compensation will be allowed.

Contractor shall color code all airfield lighting cables in ducts, manholes and the vault as acceptable to the Engineer. All costs of color coding shall be considered incidental to the contract unit price for the associated item.

The electrical work related to storm water and sanitary lift station is not included in this item, the furnishing, installation and measurement for all cables related to storm water and lift station shall be in compliance with pay items 800131, 800132 and division 16 electrical specifications.

EQUIPMENT AND MATERIALS

108-2.2 CABLE

ADD:

Airfield lighting cable under this item shall be:

- L-824, 1/C #8 5,000 V, Type C, in duct and conduit
- 1/C # 3/0, 600V XLP-USE in conduit (Electric service for lighting transclosure)
- 1/C # 6, 600V XLP-USE in conduit (Apron lighting circuits)
- 1/C # 10, 600V XLP-USE in conduit (Apron lighting and receptacle circuits)
- 1/C # 2 Ground (Electric service for lighting transclosure)
- 1/C # 10 Ground (Apron lighting and receptacle circuits)

108-2.3 BARE COPPER WIRE (COUNTERPOISE)

DELETE: This section.

108-2.4 CABLE CONNECTIONS

DELETE: Paragraphs (b), and (e).

ADD:

(f) Only L-823 Plug-In-Splice Cable Connector shall be used for airfield lighting circuit connections.

To further reduce the possibility of water (moisture) entrance into the connector between the cable and the field-attached connector, heat shrinkable tubing with interior adhesive shall be applied over all cable connections.

The heat shrinkable tubing shall cover the entire L-823 connector. All connections shall be at manholes or light bases. No direct burial splicing will be allowed.

All connections shall be at splice cans, handholes, manholes or light bases. No direct burial splicing will be allowed.

In line connections for existing cables to be spliced or those which are cut during construction shall be repaired with the cast splice kit. The Contractor shall have a minimum of five (5) splice kits on the jobsite at all times for emergency repairs. Splice markers shall be installed over each splice in cables not to be abandoned. Cast splice kits shall be as specified in paragraph (a). All field splices shall be covered with a flexible polyolefin heat-shrinkable sleeve.

108-2.7 HEAT SHRINK TUBING

Heat shrink tubing for FAA Type L-823 and receptacle cable connections shall be Raychem APL 1300/400-16, Sigmaform Corp. Series APL-823A or equal. Complete kit shall be used and shall be capable of being stripped off easily for re-entry.

Heat shrink tubing for 5KV, L-824 Airfield in-line splices shall be Raychem HVS-501 or equal.

CONSTRUCTION METHODS

108-3.1 GENERAL

ADD:

The locations of existing cables are taken from available record maps and it will be necessary for the contractor to make field investigations to determine the exact locations of underground cable and conduits at critical points.

108-3.2 INSTALLATION IN DUCT OR CONDUIT

ADD:

Contractor shall remove existing cables from existing conduit for taxiway "F" circuit as shown on the plans and install new 1/C # 8 5KV, L-824 TYPE C cable in its place.

108-3.3 TRENCHING

Change 18 inches to 30 inches in the last sentence of the second paragraph.

ADD:

The installation of GRS conduit using the plowing-in method will not be allowed.

All cable in unit-duct may be installed using the plowing-in method or direct burial, (refer to Item 108-3.11) except at critical locations where required to protect existing cables or to facilitate construction.

Modify the Supplemental Specifications to be: Cable plowing shall be done at a minimum depth of 30" below finished grade.

108-3.5 BACKFILLING

ADD:

If backhoe or comparable equipment used, sand backfill (IDOT FA-1 or FA-2) shall be required. If trencher used, marking tape shall be included to delineate cable with no backfill required.

Marking tape shall be placed 12 inches above the cables being installed.

108-3.8 SPLICING

DELETE: Paragraphs b, c, d and e.

Direct buried splices will not be allowed in new circuits unless otherwise approved by the Engineer. Any repairs necessary in the new cable after backfilling the trench or after plowing incomplete and discovered during the testing of the circuits, shall be done in accordance with Paragraph 108-2.4 (a) of this Specification.

Contractor shall use cast splicing kits as described in Article 108-2.4 for any splices made inside the electric handholes/manholes/splice cans. The cast splicing kit shall be series 82-B1 Scotch cast or 90-B1 Scotch cast as manufactured by 3M or equal. Contractor shall provide shop drawing for splicing method and cast splicing kit. Contractor shall also leave minimum 30" of slack on each side of the cable being spliced. The cost of splicing shall be incidental to the cost of installation of underground cables.

108-3.9 BARE COUNTERPOISE WIRE INSTALLATION AND GROUNDING FOR LIGHTNING PROTECTION

DELETE: This section.

108-3.10 TESTING

ADD:

The cable after installation and after connection to all isolation transformers, but before connection to power source (constant current regulators, power transformers, disconnect switches, etc.) and/or connection to load other than isolation transformers shall be tested in the following manner:

1. Contractor shall meggar all new circuit after installation and before connection of the circuit to the regulator, power transformer, disconnect switches, etc. Each test shall last for a minimum of one minute after instrument readings have been stabilized. The minimum acceptable insulation resistance value shall be 50 MEGOHMS for new circuits. The minimum acceptable insulation resistance value for existing upgraded circuits shall be no less than the initial meggar reading, taken prior to the start of construction.
2. When unacceptable readings are obtained, the contractor shall locate the fault(s) and correct them.
3. The test equipment and power to operate it shall be furnished and operated by the Contractor at no additional cost. The Engineer shall approve the equipment before testing is commenced. The Engineer shall witness all tests.
4. Circuits to remain in service will be tested prior to the start of construction to assure they are operational. These same circuits will be tested after construction has been completed, and the readings will be required to be the same or greater than the pre-construction meggar results.
5. All cable found to be defective due to installation methods shall be replaced by the Contractor at his expense.

The remaining existing airfield circuits within the working limits of this contract, which are not scheduled to be added to or deleted from, shall also be megged in the presence of the Engineer and a representative from the Airport before any work is performed. Any subsequent damage to these existing circuits shall be immediately repaired at no cost to the contract, such that meggar readings taken after completion of the repair shall be, as a minimum, equal to the reading taken before the work began. The Contractor shall provide written documentation of all meggar tests, with acceptance signatures of the airport's and engineer's representative.

108-3.12 LOCATING OF EXISTING CABLES

Contractor shall locate and mark all existing cables within ten (10) feet of proposed excavation or plowing/trenching area. Any cables found interfering with proposed excavation or cable plowing/trenching shall be hand dug and exposed. Any damaged cables shall be immediately repaired to the satisfaction of the Engineer at the Contractor's expense. The Engineer and Owner shall be notified immediately if any cables are damaged.

It should be noted that utility (Commonwealth Edison and AT&T) cables shall be located by the utility. The contact person shall be J.U.L.I.E. (Joint Utility Locating Information for Excavators) at 1-800-892-0123.

Payment for locating and marking underground cable will not be paid for separately but shall be considered incidental to the plowing/trenching of unit-duct.

108-3.13 TERMINATIONS AND CONNECTIONS

In line connections for existing cables cut during construction shall be repaired with the cast splice kit. The contractor shall have a minimum of five (5) splice kits on the jobsite at all times for emergency repairs. Splice markers shall be installed over each splice in cables not to be abandoned. Cast splice kits shall be as specified in Paragraph (a) of item 108-2.4.

Any repairs necessary after backfilling the trenches shall be done at the Contractor's expense and shall consist of replacing the entire length of damaged cable between units.

If, due to the length of spool ordered by the Contractor, it is necessary to install additional handholes, the Contractor shall supply same at no additional cost to the project. The handhole shall be the size as directed by the Engineer.

METHOD OF MEASUREMENT

108-4.1

DELETE: This section.

ADD:

The length of 1/C # 8 5KV cable in 3/4" unit duct installed in trench and 600V XLP-USE cables installed in conduit to be paid for, shall be the number of lineal feet measured in place, completed and ready for operation, and accepted as satisfactory, and no extra quantity will be allotted for any vertical distances or the required cable slack, as stated under Item 108-3.4, in the Standard Specifications. There will be a separate measurement made for each cable installed in conduit.

The cost of routing the cable through duct, trenching, plowing, backfilling and all connections shall be included in the unit price bid for the cable.

The quantities for power and control cables between sanitary lift station, magmeter vault, storm water sampling manhole, diversion structure, utility pole at storm water sampling building, chemical/electrical building and storm water sampling building will **not** be measured for payment, it shall be included in the lump sum pay items 800131 and 800132.

BASIS OF PAYMENT

108-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR108030	1/C #3/0 600V UG CABLE	PER LINEAR FOOT
ITEM AR108086	1/C #6 XLP-USE	PER LINEAR FOOT
ITEM AR108090	1/C #10 XLP-USE	PER LINEAR FOOT
ITEM AR108158	1/C #8 5 KV UG CABLE IN UD	PER LINEAR FOOT
ITEM AR108752	1/C #2 GROUND	PER LINEAR FOOT

ITEM 109 - INSTALLATION OF AIRPORT TRANSFORMERS AND VAULT EQUIPMENT

DESCRIPTION

109-1.1

DELETE: This Section.

ADD:

The Contractor shall furnish all equipment, materials and labor necessary to furnish the new apron lighting transclosure as shown in the plans or as specified herein.

This work shall include all power distribution equipment, conduits, concrete pad and wireway required for cabling used in connection of all proposed equipments at the locations and to the dimensions shown on the Plans or approved by the Engineer.

Work shall include the marking and labeling of equipment and the labeling or tagging of wires, testing of the installation, and the furnishing of all incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer.

EQUIPMENT AND MATERIALS

109-2.1 GENERAL

Revise Paragraph (a) to read as follows:

- (a) Airport lighting equipment and materials covered by FAA specifications shall have prior approval of the Federal Aviation Administration, Airport Service, Washington, D.C. 20591, and shall be listed in the latest Advisory Circular 150/5345-1, Approved Airport Lighting Equipment.

FAA approval of airport lighting equipment and subsequent inclusion in Advisory Circular 150/5345-1, "Approved Airport Equipment," only means that the test data satisfied the applicable specification requirements. This does not insure that the approved equipment will satisfactorily operate when connected powerwise and/or controlwise to other approved airport lighting equipment or "off the shelf" equipment not requiring FAA approval.

The Contractor shall ascertain that all lighting system components furnished by him (including FAA approved equipment) are compatible in all respects with each other and the remainder of the new/existing system. Any non-compatible components furnished by the Contractor shall be replaced by him at no additional cost to the airport sponsor with a similar unit, approved by the Engineer (different model or different manufacturer) that is compatible with the remainder of the airport lighting system.

109-2.22 OTHER ELECTRICAL EQUIPMENT

Contractor shall install a complete and operational apron power distribution panel and transclosure near the apron as shown on the plans. The items shall be as shown on the plans and specified herein.

Electrical Equipment to be Installed Inside the Transclosure:

Contractor shall install all the equipment necessary for a complete and operational apron lighting controllers including conduits and cabling inside the proposed transclosure and new electric service. The equipment shall include, but not limit to the following:

1) Wireways

The low voltage and high voltage wireways shall be 8" x 8" as shown on the plans. The low voltage wireway shall be rated NEMA 12. The wireways shall come complete with any necessary caps, corner sections and mounting brackets. The wiring trough shall be RD series, as manufactured by Square D, or equal. The covers for the wireway shall be hinged. The lengths of the wireways shall be shown on the plans. The wireways shall have front openings.

2) Cables

All wiring, 600V and below shall be Type THWN (unless otherwise noted), sized as indicated on the plans. Cable shall comply with Underwriters' Laboratories Standard UL-83 and shall be U.L listed as VW-1. Conductor shall be soft annealed uncoated copper and shall comply with ASTM B3 and B8. Insulation shall be rated for 600V.

Insulation shall be polyvinylchloride conforming to Underwriters' Laboratories requirements for Type THWN. The outer covering shall be nylon conforming to Underwriters' Laboratories THWN or THWN. Cable shall be U.L. listed and marked THWN. Wiring shall be Triangle Building Wire, Type THWN, or equal.

Contractor shall use new cables in all circuits in this project. No used cables shall be allowed in any portions of the circuits.

3) Power Panel (480V-PP-1)

Proposed power panel shall be furnished and installed at the location shown on the plans. Panel shall be UL listed, operating at 480/277V VAC, 3-Phase, 4 Wire and shall be in a NEMA 1 lockable enclosure. Proposed panel shall have 200A main circuit breaker with min. of 54" branch breaker mounting space. The minimum current interrupting capacity for main breaker shall be min. 30,000A and min. 18,000A for feeder breakers. The proposed panel board shall be I-Line Type HCM as manufactured by Square D, or equal.

4) Mini-Power Center

Contractor shall furnish and install a 15KVA, 480 – 120/240V, single phase, mini-power center with main circuit breakers and branch circuit breakers as shown on the plans.

5) Transclosure

The transclosure shall be tamper resistant and weather resistant. There shall be no exposed bolts and screws. The construction shall be of No. 12 Ga. mild steel minimum. The transclosure shall be of bolted construction and shall be designed to utilize welded spreader frames at top and bottom. All doors and panels shall have formed edges and all external fasteners shall be of stainless steel. The cover shall be domed to shed water. Construction shall allow additional units to be added on to the existing transclosure at a later date. The transclosure shall have venting design to dissipate the heat of the enclosed equipments. Transclosure shall be shipped completely factory assembled with lifting provisions and shall be mounted on a 4" steel channel skid with lifting provisions. Side panel shall be substituted for door on back side of transclosure. Door hinge shall have a minimum of 0.375" diameter stainless steel. Door shall have a positive 3-point latching mechanism. Door handle shall be capable of accepting a padlock and shall have 0.312" square unthreaded shaft. The primer shall be red oxide, both lead and chromate free. Paint shall be alkyd enamel. Color shall be green, Munsell No. 7.5GY3.2/1.5 with a thickness to be 2.5-3.0 mils after drying.

Transclosure shall be Cat. No. LS554426 as manufactured by Hennessy Products or equal, and shall be complete with aluminum panel.

109 – 2.25 Shop Drawings

In addition to the requirements of Section 60 Paragraph 60-09 of the General Provisions of Division 1 of these specifications, shop drawings shall also be submitted for review for all items specified in Paragraphs 109-2.10 through and including Paragraph 109 – 2.25.

CONSTRUCTION METHODS

109-3.10 GENERAL

ADD:

Contractor shall install lighting contactors, timeclock and power distribution equipment in the new lighting transclosure as shown on the plans. All electrical installation shall comply with the NEC (latest edition).

109-3.16 MARKING AND LABELING

ADD:

All new equipment, control wires, etc. installed under this contract shall be tagged, marked, or labeled as required.

109-3.17 TESTING

ADD:

The installation shall be tested in operation as a completed unit prior to acceptance. Tests shall include resistance, voltage and current readings, as required by the Engineer. Testing equipment shall be furnished by the Contractor. Tests shall be conducted as directed by the Engineer and shall be to his satisfaction. The Contractor shall be responsible for all equipment and conduit in place that will be connected to the new equipment, and any equipment or materials found to be defective or damaged shall be replaced by the Contractor at his own expense.

All testing shall be in the presence of the Engineer and an Airport Representative.

METHOD OF MEASUREMENT

109-4.1, 4.2, 4.3

DELETE: These Sections.

109-4.4

ADD: The following section:

The quantity of materials and work to be paid for under this item shall be as follows:

1. The furnishing and installation of proposed apron lighting transclosure including the concrete pad, timeclock, meter base, power panel, mini-power center, cable/conduit, wireway, contactors and grounding as a complete unit ready for operation shall be paid for under Item AR109120 ERECT ELECTRICAL TRANSCLOSURE.

BASIS OF PAYMENT

109-5.1

ADD:

Payment will be at the contract unit price per lump sum or each as described below, complete and accepted for each item. This price shall be compensation in full for all preparation, assembly, removal and disposal off of airport property, materials, labor, equipment, tools and incidentals necessary to complete the item as specified herein or as directed by the Engineer.

Payment will be made under:

ITEM AR109120 ERECT ELECTRICAL TRANCLOSURE PER LUMP SUM

ITEM 110 - INSTALLATION OF AIRPORT UNDERGROUND ELECTRICAL DUCT

DESCRIPTION

110-1.1

ADD:

This item shall consist of the construction of the proposed concrete encased, directional bored GRS conduit, and direct buried GRS conduit including appropriate duct markers at the locations shown in the plans or as directed by the Engineer.

Trenching and backfilling for the ducts conduit and handholes shall not be paid for separately, but shall be considered incidental to the associated duct. Contractor shall provide pull wire for each conduit and cap the unused conduits for future use.

The electrical work related to storm water and sanitary lift station is not included in this item, the furnishing, installation and measurement for all ducts/conduits (except 4-way concrete encased and handholes) related to storm water and lift station shall be in compliance with pay items 800131, 800132 and division 16 electrical specifications.

EQUIPMENT AND MATERIALS

110-2.2 BITUMINOUS FIBER DUCT

DELETE: This section.

110-2.3 ASBESTOS CEMENT DUCT

DELETE: This section.

110-2.5 STEEL CONDUIT

DELETE: This section

ADD:

All steel conduit used in this project shall be galvanized rigid steel.

110-2.8 ELECTRICAL HANDHOLE

Contractor shall install handholes in locations specified and detailed in the plans. Electrical handholes shall comply with requirements as detailed in the plans and of Item 751 of specifications.

110-2.8 DUCT MARKER

ADD:

Contractor shall provide duct markers for each proposed concrete encased duct, GRS conduit or existing duct being used as detailed in the plans. The cost of installation of the duct markers shall be incidental to the price of concrete encased duct and steel duct.

CONSTRUCTION METHODS

110-3.5 BACKFILLING

ADD:

Crushed Stone conforming to the requirements of Item 208 gradation shall be used for backfill at the pavement crossings for the new duct installation. The granular material shall be compacted to not less than 95% of Standard Proctor laboratory density.

METHOD OF MEASUREMENT

110-4.1

ADD:

The quantity of GRS conduit to be paid for shall be the number of lineal feet installed, measured in place, completed, and accepted.

The quantity of handhole to be paid for shall be the number of each unit installed, measured in place, completed and accepted.

The quantities for conduits between sanitary lift station, magmeter vault, storm water sampling manhole, diversion structure, utility pole at storm water sampling building, chemical/electrical building and storm water sampling building will **not** be measured for payment, it shall be included in the lump sum pay items 800131 and 800132.

BASIS OF PAYMENT

110-5.1

DELETE: This section.

ADD:

Payment will be made at the contract unit price per lineal foot of GRS conduit and concrete encased duct and completed and accepted. This price shall be full compensation for furnishing all materials, preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Trenching and backfilling shall also be included in the installation of the duct and shall not be paid for separately.

Payment will be made at the contract unit price per each of handhole completed and accepted. This price shall be full compensation for furnishing all materials, preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR110213	3" STEEL DUCT, DIRECT BURY	PER LINEAR FOOT
ITEM AR110502	2-WAY CONCRETE ENCASED DUCT	PER LINEAR FOOT
ITEM AR110504	4-WAY CONCRETE ENCASED DUCT	PER LINEAR FOOT
ITEM AR110610	ELECTRICAL HANDHOLE	PER EACH
ITEM AR110900	REMOVE DUCT	PER LINEAR FOOT

ITEM 125 - INSTALLATION OF AIRPORT LIGHTING SYSTEMS

125-1.1

ADD: Airfield lighting improvements shall include:

- Installation of new medium intensity base mounted taxiway edge lights.
- Installation of new permanent elevated retroreflective markers
- Installation of new guidance signs
- Removal of base mounted lights. All salvageable light fixtures / parts removed shall be delivered to the Owner.

125-1.9 INSPECTION, TEST AND WARRANTY

ADD:

VISUAL EXAMINATION

The most important of all inspection and test procedures is thorough visual inspections. Visual inspections shall be made frequently during installation, at completion of installation, and before energizing the circuits. A careful visual inspection can reveal defects that can be corrected prior to acceptance tests and energization. Serious damage may occur if defects are subjected to electrical tests or energization. Visual inspections shall include appraisal of:

- (a) Correctness of external connections.
- (b) Good work performance.
- (c) Cleanliness.
- (d) Safety hazards.
- (e) Specific requirements listed herein for individual items. While all equipment manufactured under specifications pass strict factory tests prior to shipment, it shall be inspected for shipping damage immediately upon receipt.

ELECTRICAL TESTS ON SERIES LIGHTING CIRCUITS

Before modifying any series circuit, verify the performance of the existing circuit by checking the supply voltage to the regulator and measuring the output current from the regulator on all brightness steps under existing load.

- (a) For home run segments that will not be replaced, disconnect at S-1 cutout and at first fixture and verify cable continuity.
- (b) Check cable connections and perform electrical tests on cable as specified in Section 108.

LIGHTING FIXTURES

An inspection shall be made to determine that the color, quantity, and locations of light are in accordance with the installation drawings. Each light shall be inspected to determine that it is operable, glass is not broken or cracked, correct lamps are installed, and it has been properly leveled and aimed, in accordance with technical orders and manufacturer's instructions, where applicable.

CONSTANT CURRENT REGULATORS

The supply voltage and input and output current shall be checked at the regulator to see that they operate properly and that regulators are not overloaded due to shorts to ground or excessive leakage.

- (a) Visual Examination. Each constant current regulator shall be visually examined to insure that porcelain bushings are not cracked, no shipping damage has occurred, internal and external connections are correct, switches and relays operate freely and are not tied or blocked, fuses (if required) are correct, and that the oil level of oil-filled regulators is correct. Relay panel covers only shall be removed for this examination; it is not necessary to open the main tank of oil-filled regulators. The instructions on the plates attached to the regulator shall be accomplished. After examination and tests are completed, replace all covers tightly.
- (b) Electric Tests. The supply voltage and input tap shall be checked to see that they correspond. With the load disconnected, the regulator shall be energized and the open circuit protector observed to see that it de-energizes the regulator within 2 or 3 seconds.

FINAL ACCEPTANCE TESTS

After components and circuits have been inspected, as specified in the preceding paragraphs, the entire system shall be inspected and tested as follows:

- (a) Operate each switch for the modified lighting circuits from the remote control position (ATCT) so that each switch position is reached at least twice. During this process, all lights and vault equipment shall be observed to determine that each switch properly controls the corresponding circuit.
- (b) Repeat the above test using the local control switches on the regulators.
- (c) Each lighting circuit shall be tested by operating it continuously at maximum brightness for at least 6 hours. Visual inspection shall be made at the beginning and end of this test to determine that the correct numbers of lights are operating at full brightness. Dimming of some or all of the lights in a circuit is an indication of grounded cables.
- (d) In addition to the above, all equipment shall be subjected to any and all performance tests specified in the manufacturer's instructions.
- (e) Photometric testing. The Airport may, upon completion of the lighting installation and as part of acceptance testing, perform field photometric testing of each new light fixture to assure the installed runway lights meet the photometric requirements specified by FAA. The test results will be recorded and furnished to the Contractor, with any noted deficiencies. The Contractor is responsible for correcting any deficiencies at no additional cost to the Owner. The Contractor shall furnish spares in support of this testing, to include 15% lamps and 5% lenses for the new in-pavement lights. Spares not used shall be provided to the Airport upon completion of the work

125-1.10 GUARANTEE

ADD:

All equipment furnished and work performed under the Contract Documents shall be guaranteed against defects in materials or workmanship for a period of one (1) year from the date of final acceptance. This guarantee does not replace any responsibility for errors or omissions as set forth in state law. Any long-term warranties issued or offered by manufacturers for items of equipment shall be turned over to the Airport.

125-1.11

Any failure of equipment or work due to defects in materials or workmanship shall be corrected by the Contractor at no cost to the Airport.

125-1.12

The Contractor shall ascertain that all lighting system components furnished by him (including FAA approved equipment) are compatible in all respects with each other and the remainder of the new/existing system. Any incompatible components furnished by the Contractor shall be replaced by him at no additional cost to the Airport with a similar unit approved by the Project Engineer (different model or manufacturer) that is compatible with the remainder of the airport lighting system.

125-1.13

The Contractor-installed equipment (including FAA approved) shall not generate any electromagnetic interference in the existing and/or new communications, weather and air traffic control equipment. Any equipment generating such interferences shall be replaced by the Contractor at no additional cost with the equipment meeting applicable specifications and not generating any interference.

EQUIPMENT AND MATERIALS

125-2.1 GENERAL

ADD:

All new equipment shall be listed in Advisory Circular 150/5345-1(Latest Edition) - Approved Airport Lighting Equipment.

Before any electrical materials are ordered, the Contractor shall furnish the Engineer a list of the materials and equipment to be incorporated in the work. This list shall include the name of each item, the Federal Aviation Administration specification number, the manufacturer's name, the manufacturer's catalog number, and the size, type and/or rating of each item, catalog cuts, test data, fuse curves, outline drawings, nameplate drawings, wiring diagrams, and schematic diagrams.

After the list has been approved by the Engineer and prior to installation, the Contractor shall assemble the equipment and materials at a single location, on-site, and request inspection by the Engineer. None of the equipment or materials, other than duct or conduit, may be used on the job until such as inspection has been completed.

All test results from required tests shall be submitted to the Engineer for review and approval.

Airport lighting equipment and materials covered by FAA specifications shall have prior approval of the Federal Aviation Administration, Airport Service, Washington, DC 20591, and shall be listed in the current edition of FAA Advisory Circular AC 150/5345-53, Airport Lighting Equipment Certification Program. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when required by the Engineer.

The following documents, of the issue in effect on the date of application for qualification, are applicable to the extent specified:

<u>Item</u>	<u>Specification</u>	<u>Advisory Circular</u>
Elevated Lights	L-861, L-862	AC 150/5345-46A
Transformers, Isolation, 60 Hz	L-830	AC 150/5345-47
Light base, load bearing	L-868	AC 150/5345-42
Light base, non-load bearing	L-867	AC 150/5345-42
Elevated Marker	L-853	AC 150/5345-39B

All FAA Advisory Circular referenced in this specification refer to the most recent edition in circulation.

125-2.3 CONCRETE

DELETE: This section.

ADD:

All structural concrete shall meet the requirements of Item 610.

125-2.7 ISOLATION TRANSFORMERS

ADD:

New transformers for shall be L-830, 6.6A Pri./6.6A Sec. of the wattage recommended by the manufacturer. The number of transformers per light shall also be as recommended by the manufacturer.

125-2.8 LIGHT CANS

Light cans for the new concrete base mounted lights shall be L-867 Class I, Size B in conformance with FAA Advisory Circular AC 150/5345-42 (latest revision) with 3/4" blank cover plates.

125-2.9 LIGHT LENS

Lenses for new taxiway light lenses shall be blue.

125-2.10 TAPE

ADD:

Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88, respectively, as manufactured by the Minnesota Mining and Manufacturing Company, or an approved equal.

125-2.14 TAXIWAY LIGHTS

ADD:

Taxiway lights shall be base mounted and shall meet the following FAA specifications:

L-861T Medium Intensity Taxiway Lights

125-2.15 ELEVATED RETROREFLECTIVE MARKERS

ADD:

Elevated retroreflective markers shall be blue pavement mounted, omnidirectional, frangible markers, and model as manufactured by Safe-Hit or approved equal.

CONSTRUCTION METHODS

125-3.1 GENERAL

ADD:

New edge lights shall conform to the details and dimensions shown in the plans.

The Contractor shall exercise caution in the installation of all light units. Any units damaged by the Contractor's operations shall be repaired or replaced to the satisfaction of the Engineer at no additional cost to the contract.

125-3.4 PHASING AND INTERRUPTIONS

All existing electrical equipment and lighting systems not included in the phase of work being performed must be kept in operation, unless prior approval of the Owner has been received and as otherwise specified below and on the Drawings. The Contractor may use salvaged materials for temporary construction where required. The permission for temporary work and using salvaged materials shall be obtained from the Owner. Lighting for active runway and taxiway surfaces shall be maintained. Work shall be coordinated with paving operations.

Refer to the special provision of the specification for notification requirements and other information regarding work interruptions due to airport operational requirements or Contractor anticipation for exceeding the limitations described in the above paragraph.

125-3.5 LIGHT REMOVALS

The Contractor shall exercise care in removal of the existing airfield lights to prevent damage. Existing light bases or stakes shall be completely removed and disposed of by the Contractor off airport property. The excavations shall be backfilled with earth and compacted to the satisfaction of the Engineer. Existing fixtures and transformers shall be salvaged and remain property of the Airport. The material shall be delivered to the Airport Maintenance Facility.

METHOD OF MEASUREMENT

125-4.1

DELETE: Entire section.

ADD:

The quantities to be paid for under this item shall consist of:

- (a) The number of edge lights completely removed.
- (b) The number of elevated retroreflective markers in place as complete units and accepted by the Engineer.
- (c) The number of edge lights in place as complete units and accepted by the Engineer.
- (d) The number of taxi guidance signs in place as complete units and accepted by the Engineer.

BASIS OF PAYMENT

125-5.1

Payment will be made at the contract unit price for each complete item furnished and installed in place by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, removals, modifications, relocation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment for topsoiling and seeding for the lighting and signage installations shall not be paid for separately but shall be considered incidental to the associated items shown below.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR125100	ELEVATED RETROREFLECTIVE MARKER	PER EACH
ITEM AR125415	MITL- BASE MOUNTED	PER EACH
ITEM AR125442	TAXI GUIDANCE SIGN, 2 CHARACTER	PER EACH
ITEM AR125444	TAXI GUIDANCE SIGN, 4 CHARACTER	PER EACH
ITEM AR125902	REMOVE BASE MOUNTED LIGHT	PER EACH

DIVISION VIII – MISCELLANEOUS

ITEM 150510 – ENGINEER’S FIELD OFFICE

CHECK SHEET #5

ENGINEER’S FIELD OFFICE

150-2.1

REVISE:

Paragraph (g) to the following:

One (1) electric water cooler dispenser capable of dispensing cold and hot water and a supply of water bottles as needed.

Paragraph (j) to the following:

1 dry process copy machine with automatic feeding capabilities (including maintenance and operating supplies) capable of both collating and reproducing prints up to a half size (11"X 17") and capable of copying field books.

ADD:

(o) One first-aid cabinet fully equipped.

(p) One (1) 800 Watt, 0.8 cubic foot microwave oven.

(q) One (1) Coffee Maker

(r) Solid waste disposal consisting of two (2) 28-quart waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service.

150-2.2 FIELD LABORATORY

The Contractor shall provide an onsite laboratory and test equipment to perform their quality control testing.

The laboratory shall be of sufficient size and be furnished with the necessary equipment, supplies and current published test methods for adequately and safely performing all required tests. The laboratory will be approved by the Engineer. Production of a mixture shall not begin until the Engineer provides written approval of the laboratory.

Test equipment shall be maintained and calibrated as required by the appropriate test method, and when required by the Engineer. This information shall be documented on the Division of Highway’s “Calibration of Concrete Testing Equipment Form” form.

Test equipment used to determine compressive or flexural strength shall be recalibrated prior to the start of production. The Contractor shall have the calibration documentation available at the test equipment location.

The Engineer will have unrestricted access to the laboratory at any time to inspect measuring and testing equipment, and will notify the Contractor of any deficiencies. Defective equipment shall be repaired or replaced by the Contractor and approved by the Engineer prior to the start of the next concrete production day.

BASIS OF PAYMENT

150-3.1

DELETE the second paragraph of this section.

Payment will be made under:

ITEM AR150510	ENGINEER'S FIELD OFFICE	PER LUMP SUM
ITEM AR150515	FIELD LABORATORY	PER LUMP SUM

ITEM 150520 – MOBILIZATION

DESCRIPTION

150-1.1

This work shall include all activities and associated costs related to transportation of contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable.

This work includes mobilization required by the contract at the time of notice to proceed. If additional mobilization activities and costs are required during the performance of the contract as a result of added items of work, such costs shall be included in the unit price for the item or items of work added. This does not apply to any approved "time and materials work."

This work also includes all efforts related to restoration of the project site, staging area and haul road as directed in the bidding documents at the conclusion of the job. This activity includes, but is not limited to, incidental grading, seeding and clean-up, as required to restore the project site to original condition.

METHOD OF MEASUREMENT

150-2.1

This item shall consist of the mobilization of the contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization for specific items of work for which payment is provided elsewhere in the contract.

Transportation of any materials incorporated into the permanent works shall not be considered a mobilization item.

All roads, parking lots, fences, structures, etc., shall be protected from damage by equipment during the contract period.

Access shall be as shown on the drawings. Alternate access routes must be approved by the Engineer prior to use. All access routes shall be restored by the contractor to a condition equal to or better than the condition prior to the commencement of work under this contract.

BASIS OF PAYMENT

150-3.1

This work shall be paid for at the lump sum price for MOBILIZATION. The amount which a Contractor will receive payment for, according to the following schedule, will be limited to six percent of the original contract amount. Should the bid for mobilization exceed six percent, the amount over six percent will not be paid until 90 percent of the adjusted contract value is earned.

- (a) Upon issuance of a notice-to proceed, 50 percent of the pay item will be paid.
- (b) When ten percent of the original contract amount is earned, an additional 10 percent of the pay item will be paid.

- (c) The remaining 40 percent of the pay item will be paid along with any amount bid in excess of six percent of the original contract amount upon final acceptance of the project by the engineer. Final acceptance includes satisfactory completion of all punch list items in accordance with written instruction from the engineer as well as acceptance of all final documentation.

Nothing herein shall be construed to limit or preclude partial payment for other items as provided for by the contract.

Payment will be made under:

ITEM AR150520 MOBILIZATION PER LUMP SUM

ITEM 150540 – HAUL ROUTE

DESCRIPTION

150-1.1

Work under this item shall include the construction of and maintenance of the haul road on airport property throughout the construction project. Work may include the placement and grading of crushed aggregate or other material approved by the engineer as necessary or bituminous pavement repair as required by the engineer. The location of the haul route is shown on the plans. Any dust control watering required by the engineer of the haul road shall also be part of this item.

CONSTRUCTION METHODS

150-2.1

The existing roadway identified as the proposed haul route onto airport property is shown to be removed in the construction plans. Once grading of the proposed haul road is complete, the Contractor will be required to place and grade crushed aggregate or repair bituminous pavement as necessary to repair ruts and damage caused by the construction operations. At the completion of the project, the Contractor shall leave the road in good condition to the satisfaction of the engineer.

BASIS OF PAYMENT

150-3.1

The haul route will include all costs associated with constructing and maintaining the haul route in accordance with the construction drawings and these special provisions. Payment shall be made at the contract lump sum price, which price and payment shall constitute full compensation for all associated material, labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

ITEM AR150540

HAUL ROUTE

PER LUMP SUM

ITEM 156000 – EROSION CONTROL

CHECK SHEET #8

DESCRIPTION

156-1.1

ADD:

All entrances to the construction site shall have a stabilized entrance constructed in accordance with Standard IL-630 of the Natural Resources Conservation Service and the current Illinois Urban Manual.

MATERIALS

156-2.6 EROSION CONTROL BLANKET

The Contractor shall have the option to install excelsior blanket or knitted straw mat as specified below:

Excelsior Blanket

Excelsior blanket shall consist of a machine-produced mat of wood excelsior of 80 percent 6 inches or longer fiber length. The wood from which the excelsior is cut shall be properly cured to achieve adequately curled and barbed fibers.

The blanket shall be of consistent thickness, with the fiber evenly distributed over the entire area of the blanket. The excelsior blanket shall be covered on the top side with a 90-day biodegradable extruded plastic mesh netting having an approximate minimum opening of 16 x 16 mm (5/8 x 5/8") to an approximate maximum opening of 50 x 25 mm (2 x 1"). The netting shall be entwined with the excelsior mat for maximum strength and ease of handling.

The excelsior blanket shall comply with the following specifications:

Minimum width, inches, plus/minus 1 inch	24
Minimum weight per square yard, pounds, minus 10 percent	0.8
Minimum length of roll, feet, approximately	150

The excelsior blanket shall be smolder resistant and shall withstand the following test. The excelsior blanket specimen shall not flame or smolder for more than a distance of 12 inches from a spot where a lighted cigarette is placed on the surface of the blanket.

The manufacturer shall furnish a certification with each shipment of blanket stating the number of rolls furnished and that the material complies with the requirements of the Specifications.

Knitted Straw Mat

Straw mat shall be made of a 100% biodegradable straw, 0.50 lbs/sq. yd., with light weight photodegradable netting on the top side. The mat shall be sewn together with cotton thread. Straw mat shall be North American Green S75 or approved equal.

The manufacturer shall furnish a certification with each shipment of blanket stating the number of rolls furnished and that the material complies with the requirements of the Specifications.

156-2.7 STAKES FOR EROSION CONTROL BLANKET

The blanket shall be secured with biodegradable stakes acceptable to the Engineer. Metal staples will not be allowed.

156-2.8 TEMPORARY DITCH CHECK

Temporary ditch checks shall be triangular-shaped, having a height of at least eight to ten inches (8" - 10") in the center with equal sides and a sixteen- to twenty-inch (16" - 20") base. The triangular-shaped inner material shall be urethane foam. The outer cover shall be a woven geotextile fabric placed around the inner material and allowed to extend beyond both sides of the triangle two to three (2' - 3') feet. Standard length of each dike will be seven feet (7') unless otherwise indicated on the plans.

156-2.9 INLET PROTECTION

Fabric shall comply with the requirements set forth in Section 2.1.

CONSTRUCTION METHODS

156-3.3 TEMPORARY DITCH CHECK

DELETE: The entire section and REPLACE with the following:

The Dikes shall be attached to the ground with Wire Staples. The Staples shall be No. 11 gauge wire and be at least six to eight (6" - 8") inches long. Staples shall be placed as indicated on the detail.

156-3.9 EROSION CONTROL BLANKET

Within 24 hours from the time seeding has been performed, the blanket shall be placed. Prior to placing the mat or blanket, the areas to be covered shall be relatively free of all rocks or clods over 1-½ inches in diameter, and all sticks or other foreign material that will prevent the close contact of the mat or blanket with the seed bed. If as a result of a rain, the prepared seed bed becomes crusted or eroded, or if the eroded places, ruts or depressions exist for any reason, the Contractor will be required to rework the soil until it is smooth and to reseed such areas which are reworked. After the area has been properly shaped, fertilized and seeded, the mat or blanket shall be laid out flat, evenly and smoothly, without stretching the material.

The blanket shall be laid in accordance with the manufacturer's recommendations. All ends and edges shall be tightly butted together.

The blanket shall be held in place by means of stakes. The stakes shall be driven at a 90-degree angle to the plane of the soil. Stakes shall be spaced not more than 3 feet apart in 3 rows for each strip, with a row along each edge and one row alternately spaced in the middle. All ends shall be fastened by stakes spaced 6 inches apart across the width.

Once turf growth has been established, all non-biodegradable components shall be removed by the contractor. This would include any item that would interfere with the mowing of the new turf or which might damage mowing equipment. Furthermore, the contractor shall fill with topsoil or smoothly grade any ruts or gullies that developed during the turf grow in period to the satisfaction of the Owner. This work shall be considered incidental to this item.

156-3.10 INLET PROTECTION

The inlet protection shall be constructed to the detail shown on the construction plans

METHOD OF MEASUREMENT

156-4.4

Erosion control blanket shall be the number of square yards satisfactorily completed.

156-4.5

The number of ditch checks paid for shall be the number of temporary ditch checks shown on the plans or ordered by the Resident Engineer used to control erosion.

156-4.6

The number of inlet protections paid for shall be the number of temporary inlet protections shown on the plans or ordered by the Resident Engineer used to control erosion.

BASIS OF PAYMENT

156-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR156510	SILT FENCE	PER LINEAR FOOT
ITEM AR156511	DITCH CHECK	PER EACH
ITEM AR156520	INLET PROTECTION	PER EACH
ITEM AR156531	EROSION CONTROL BLANKET	PER SQUARE YARD

ITEM 156540 – RIPRAP

CHECK SHEET # 10

MATERIALS

156540-2.1 RIPRAP

DELETE: The second sentence and REPLACE with:

The Riprap gradation shall be RR3.

156540-2.2 FILTER FABRIC

DELETE: The entire section and REPLACE with:

The filter fabric material shall consist of nonwoven filaments formed from a plastic yarn of a long-chain synthetic polymer composed of at least 85 percent by weight of polyolefins, or polyesters, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. After forming, the fabric shall be processed so that the filaments retain their relative positions with respect to each other. The fabric shall be free of defects or flaws which significantly affect its physical and/or filtering properties.

The filter fabric shall be formed in widths of not less than 6 feet (2 m). Sheets of fabric may be sewn together with thread of a material meeting the chemical requirements given for the plastic yarn to form fabric widths as required. The sheets of filter fabric shall be sewn together at the point of manufacturer or another approved location.

The texture of the fabric shall be such that the bedding and riprap will remain in an equilibrium state and not slip or slide. The filter fabric shall be rot proof, mildew proof, insect resistant, have a high dimensional stability when set, have good soil filtration characteristics, have a high resistance to tear propagation in all directions, and meet the following minimum conditions and ASTM Tests for the gradation of riprap specified:

Weight of Fabric (oz/sq yd), ASTM D 3776 (Mod.)	6.0
Burst Strength (psi), ASTM D 3786 (Note 1)	250
Trapezoidal Tear Strength (lbs), ASTM D 5733 (Note 2)	60
Grab Tensile Strength (lbs), ASTM D 4632 (Note 2)	160
Grab Tensile Elongation (%), ASTM D 4632 (Note 2)	20

Note 1. Manufacturer's certification of fabric to meet requirements.

Note 2. Test sample shall be tested wet.

The vendor shall furnish certified test reports with each shipment of material attesting that the fabric meets the above requirements.

Fabric shall be delivered to the jobsite in such a manner as to facilitate handling and incorporation into the work without damage. In no case shall the fabric be stored or exposed to direct sunlight that might significantly diminish its strength or toughness.

CONSTRUCTION METHODS

156540-3.1

ADD:

Material shall be spread uniformly on the filter fabric in a satisfactory manner, to the neat lines specified. Placing of material by methods, which will tend to segregate particle sized within the Riprap will not be permitted. Any damage to the surface of the filter fabric during placement of the Riprap shall be repaired before proceeding with the work. Compaction of the foundation layer will not be required, but it shall be finished to present a reasonably even surface free from mounds, windrows or depressions.

Stone shall be placed on the fabric layer in such a manner as to produce a reasonably well graded mass of rock with the minimum practicable percentage of voids providing maximum interlocking of stones and shall be constructed to the lines and grades shown.

METHOD OF MEASUREMENT

156540-4.1

ADD:

Payment for furnishing and installing geotechnical fabric shall not be paid for separately, but shall be considered incidental to Riprap.

BASIS OF PAYMENT

156540-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR156540

RIPRAP

PER SQUARE YARD

ITEM 760 – WATER MAIN PIPE

DESCRIPTION

760-1.1

Under this item, the Contractor shall provide all labor, equipment and materials necessary to construct the water main as shown on the plans. Testing of all water main shall be done by the Contractor and witnessed by the Engineer.

Corporation stop, curb stop and box shall also be included with this item.

Pipe bedding and trench backfill will be incidental to this item and shall not be measured for separate payment.

MATERIALS

760-2.1

Water service pipe shall be constructed of 1" Type K soft copper tubing.

Corporation stop material and installation shall conform to ANSI/AWWA C800 latest revision. All taps shall be direct and shall not require saddles.

Curb stops shall be Minneapolis pattern with flared connections as manufactured by A.Y. McDonald 6104, Ford B22-444M, Mueller H-15151, or equal. Curb boxes shall be 5'-6" bury Minneapolis pattern with a minimum 1-1/4" upper section equal to A.Y. McDonald 5614, Ford EM-55-56, Mueller, Bingham & Taylor or equal.

760-2.2

Bedding - The material for bedding shall meet the IDOT gradation CA-11.

760-2.3

Backfill - The material used for trench backfill shall be aggregate meeting the requirements section 701 of the special provisions.

CONSTRUCTION METHODS

760-3.1

Copper service connection shall be connected to the main by a corporation stop and shall be controlled by a curb stop accessible through a curb box. The curb stop and box shall be installed on the R.O.W. line, and shall not be located in or under any walkway or driveway.

Curb stops shall be at 5'-6" depth of bury.

760-3.2

Copper water service and connection shall be installed per the following:

- a. "Engineering Design Criteria for Public Works," July 1, 1988 REVISED March 1997 – City of Rockford, Illinois, Department of Public Works.
- b. "Standard Specifications for Water and Sewer Main Construction in Illinois," latest edition.

METHOD OF MEASUREMENT

770-4.1

Water main will be measured by the lineal foot in place. Corporation stop, curb stop and box shall not be measured for payment, but shall be considered incidental to the watermain.

BASIS OF PAYMENT

770-5.1

Payment for water main shall be made at the contract unit price per lineal foot bid for 1" water main of the appropriate material, application and depth. Payment shall be full compensation for excavation, connections, bedding, installation, compaction, testing, and all labor, materials, equipment as shown on the plans and as specified herein to provide a complete and operational sanitary sewer.

Bedding and trench backfill will be incidental to the respective item and shall not be measured for payment.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR760301 1" WATER MAIN - PER LINEAL FOOT.

ITEM 770 - SANITARY SEWER PIPE

DESCRIPTION

770-1.1

Under this item, the Contractor shall provide all labor, equipment and materials necessary to construct the sanitary sewer as shown on the plans. Testing of all sanitary sewer shall be done by the Contractor and witnessed by the Engineer.

Pipe bedding and trench backfill will be incidental to this item and shall not be measured for separate payment under Item Sanitary Sewer.

MATERIALS

770-2.1

Pipe materials shall be as detailed on the plans. For a detailed scope of pipe materials, reference Appendix A section 15260. Miscellaneous concrete shall meet the requirements of section 610.

770-2.2

Bedding - The material for bedding shall meet the IDOT gradation CA-11.

770-2.3

Backfill - The material used for trench backfill shall be aggregate meeting the requirements section 701 of the special provisions.

CONSTRUCTION METHODS

770-3.1

For a detailed scope of pipe construction methods, reference Appendix A section 15265.

770-3.2

Pipe Installation - Pipe shall be installed to the line and grades shown on the plans.

Care shall be taken to properly align the pipe before the joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned.

Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted. At the end of the work day, the last pipe laid shall be blocked in an effective way to prevent creep "down time."

770-3.3

Survey Line and Grade - Survey line and grade control hubs at a fifty (50) foot maximum spacing and at a change in line and grade will be provided by the Contractor, except a greater interval may be used in conjunction with the use of a laser in maintaining line and grade.

The Contractor shall constantly check line and grade of the laser beam and the pipe and in the event they do not meet specified limits described hereinafter, the work shall be immediately stopped, the Engineer notified, and the cause remedied before proceeding with the work.

770-3.4

Dewatering - Dewatering sufficient to maintain the water level 12 inches below the surface of the trench bottom or base of the bedding course, shall be accomplished prior to pipe laying and jointing, if not prior to excavation and placing of the bedding as called for in other sections of the specifications or Special Provisions. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe and its foundation. **Cost of any dewatering operations shall be incidental to the sanitary sewer.**

METHOD OF MEASUREMENT

770-4.1

Sanitary sewer will be measured by the lineal foot in place. Sanitary sewer shall be measured along the centerline of the pipe to the center of the wall of each manhole or connection.

BASIS OF PAYMENT

770-5.1

Payment for sanitary sewer shall be made at the contract unit price per lineal foot bid for 8", 10", and 15" sanitary sewer of the appropriate material, application and depth. Payment shall be full compensation for excavation, connections to proposed/existing manholes, bedding, installation of sewer, compaction, testing and televising, and all labor, materials, equipment as shown on the plans and as specified herein to provide a complete and operational sanitary sewer.

Bedding and trench backfill will be incidental to the respective item and shall not be measured for payment.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

- ITEM AR770508 8" SANITARY SEWER - PER LINEAL FOOT.**
- ITEM AR800095 15" SANITARY SEWER - PER LINEAL FOOT.**
- ITEM AR800096 10" FORCE MAIN - PER LINEAL FOOT.**

ITEM 770700 – SANITARY LIFT STATION

DESCRIPTION

770700-1.1

The Work to be accomplished under this Section consists of furnishing all labor, materials, equipment, and services necessary for the construction of a sanitary lift station as shown on the Contract Drawings. Included, but not limited to, is the clearing of the lift station site, excavation, sheeting and bracing, backfill, compaction, finish grading and surface restoration. The facility components shall include, but not necessarily be limited to, wet well, valve vault, two (2) submersible raw sewage pumps; pump discharge connections; guide rails; bottom, intermediate, and upper guide rail supports; lifting cables; discharge piping, valves, couplings, and supports; pressure gauges, access hatches; liquid level sensors; electrical connection; and any other items required to make the installation function per its design intent. All components shall be installed in, on, or near a cast-in-place sanitary lift station. The structures and dimensions shall be as shown on the Contract Drawings. For detailed descriptions pertaining to the metal fabrications and access hatches, refer to Appendix A section 05500. For detailed description pertaining to the handrails, refer to section 05520. For a detailed scope of electrical work, reference specification sections of Appendix A Division - 16 Electrical. For a detailed scope of the submersible pumps, reference specification Appendix A section 11310. For a detailed scope of the valves, reference specification Appendix A section 15270. For a detailed scope of the piping materials and installation, reference specification Appendix A sections 15260 and 15265.

MATERIALS

770700-2.1

Concrete shall meet the requirements of item 610.

770700-2.2

Steel reinforcement shall meet the requirements of item 751.

770700-2.3

Grating for access hatches shall be aluminum as shown on the plans.

770700-2.4

Bedding and backfill shall meet the requirements of item 751.

CONSTRUCTION METHODS

770700-3.1

All precast and cast-in-place concrete construction methods shall meet the requirements of item 751.

770700-3.2 DEWATERING

The Contractor shall, at all times, provide and maintain in operation pumping and/or well point equipment for the complete dewatering of the excavation. No structure shall be permitted to be constructed in an excavation in which any amount of water flows or is pooled. The cost of dewatering shall be included in the unit price of the structure.

METHOD OF MEASUREMENT

770700-4.1

The sanitary lift station work items will not be measured for payment separately but will be measured as a LUMP SUM. This work shall include all structure components and shall include, but not necessarily be limited to, wet well, valve vault, two (2) submersible raw sewage pumps; pump discharge connections; guide rails; bottom, intermediate, and upper guide rail supports; lifting cables; discharge piping, valves, couplings, and supports; pressure gauges, access hatches; liquid level sensors; electrical connection; and any other items required to make the installation function per its design intent and shall be complete as detailed in the plans and in these specifications.

The electrical work related to sanitary lift station including, but not limited to disconnects, junction boxes, cable/conduit, pump controller, flow meter and items required for a complete operational system shall be paid under the lump sum pay item AR800132.

BASIS OF PAYMENT

770700-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

The Sanitary Lift Station will be paid for at the contract unit price per lump sum, complete and in place. The price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling, dewatering and placing of the materials; furnishing and installation of such specials and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

ITEM AR770700 SANITARY LIFT STATION PER LUMP SUM

ITEM 770 - SANITARY MANHOLES

DESCRIPTION

770-1.1

This item shall include installation of sanitary manholes as shown on the plans and specified herein.

MATERIALS

770-2.1

Manholes for sanitary sewer shall meet the requirements set forth in Section 32 of the "Standard for Water and Sewer Main Construction in Illinois" (latest edition). Manholes will be precast concrete and watertight with an elastometric seal for sanitary manhole pipe entrances. Manhole castings shall be as shown on the plans. The words "Sanitary Sewer" shall be cast in the lid. Cast iron manhole frame shall have solid lid with concealed pickhole and watertight gasket.

Manhole steps shall be furnished and installed as shown on the plans and shall be polypropylene coated steel reinforcing roads as manufactured by M.A. Industries, Catalog No. M.A. PS 1 PF, or equal.

770-2.2

Connections between a sanitary manhole and sanitary sewer pipe shall be watertight. The connection shall utilize a connector which meets ASTM C-923 "Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes" (Latest revision). The connector shall be cast in the manhole wall and shall be capable of remaining watertight for pipe deflection up to 10⁰ in any direction and for differential loading between pipe and manhole. The manhole connection shall be A-lok Products, Inc. or equal.

770-2.3

The frame, chimney and top lip of the cone section shall be sealed with a chimney seal. Chimney seal shall be "Adaptor-Seal", "Infa-Seal", or equal.

Each manhole cone and barrel section joint shall also be externally sealed with a 6" wide (min.) sealing band of rubber and mastic. The band shall have an outer layer of rubber or polyethylene with an under layer of rubberized mastic meeting the requirements of ASTM C-877.

CONSTRUCTION METHODS

770-3.1

Manholes shall be installed on a 6" IDOT CA-11 under the manhole bottom.. No more than 8" maximum concrete adjusting rings may be utilized to meet the grades specified. All lift lug holes shall be sealed watertight.

770-3.2

Backfill requirements and material shall be selected granular material as specified under Item 701-3.7.

770-3.3

Each manhole shall be vacuum tested after final surface restoration has been completed. All lift holes shall be plugged with a non-shrinking grout. The manhole frame, adjusting rings and chimney seals shall be in place when testing. No grout shall be placed in the horizontal joints before testing. All pipes entering the manhole shall be plugged, taking care to securely brace the plugs from being drawn into the manhole. A vacuum of ten (10) inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine (9) inches of mercury (Hg) for the following time periods for each size manhole:

- Forty-eight (48) inches Diameter – sixty (60) seconds
- Sixty (60) inches Diameter – seventy-five (75) seconds
- Seventy-two (72) inches Diameter – ninety (90) seconds

Manhole testing will be in accordance with ASTM-1244. The contractor shall provide all material and equipment necessary for testing. Should the manhole fail the vacuum test, all leaks shall be sealed with an approved non-shrinking grout and re-tested until a satisfactory result is obtained.

770-3.4

Dewatering - Dewatering sufficient to maintain the water level 12 inches below the surface of the excavation bottom or base of the bedding course, shall be accomplished prior to manhole installation, if not prior to excavation and placing of the bedding as called for in other sections of the specifications or Special Provisions. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the excavation. The normal water table shall be restored to its natural level in such a manner as to not disturb the manhole. **Cost of any dewatering operations shall be incidental to the manhole.**

METHOD OF MEASUREMENT

770-4.1

Measurement will be based on a per each basis for each sanitary manhole installed of the appropriate diameter.

BASIS OF PAYMENT

770-5.1

Payment for furnishing and installing manholes, including all appurtenances, connections and backfilling, shall be at the contract unit price each bid for SANITARY MANHOLE of the appropriate diameter.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made under:

ITEM AR770704 SANITARY MANHOLE 4' - PER EACH.

ITEM 800006 – DUCKBILL CHECK VALVE

DESCRIPTION

800006-1.1

This item shall include installation of duckbill check valves as shown on the plans and specified herein.

MATERIALS

800006-2.1

For a detailed description of the duckbill check valve materials, reference specification Appendix A section 15270.

CONSTRUCTION METHODS

800006-3.1

For a detailed description of the duckbill check valve construction methods, reference Appendix A specification section 15270.

METHOD OF MEASUREMENT

800006-4.1

Measurement will be based on a per each basis for each Duckbill Check Valve installed.

BASIS OF PAYMENT

800006-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made at the contract unit price per each for Duckbill Check Valves. This price shall be full compensation for furnishing all materials, all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

ITEM AR800006 DUCKBILL CHECK VALVE PER EACH

ITEM 800018 – MAGNETIC FLOW METER AND VAULT

DESCRIPTION

800018-1.1

The Work to be accomplished under this Section consists of furnishing all labor, materials, equipment, and services necessary for the construction of a magnetic flow meter and vault as shown on the Contract Drawings. Included, but not limited to, is the clearing of the magnetic flow meter site, excavation, sheeting and bracing, backfill, compaction, finish grading and surface restoration. The facility components shall include, but not necessarily be limited to, base slab, RCP section, top slab, submersible magnetic flowmeter, pipe support, fittings, couplings, piping, vent pipe, access hatch, manhole steps, electrical connection; and any other items required to make the installation function per its design intent. All components shall be installed in, on, or near a pre-cast magnetic flow meter vault. The structures and dimensions shall be as shown on the Contract Drawings. For a detailed scope of electrical work, reference specification sections of Appendix A Division 16 - Electrical. For a detailed scope of the magnetic flow meter, reference specification Appendix A section 13423.

MATERIALS

800018-2.1

Concrete shall meet the requirements of item 610. RCCP shall meet the requirements of item 701.

800018-2.2

Steel reinforcement shall meet the requirements of item 751.

800018-2.3

Aluminum hatch shall be as shown on the plans.

800018-2.4

Bedding and backfill shall meet the requirements of item 751.

CONSTRUCTION METHODS

800018-3.1

All pre-cast and cast-in-place concrete construction methods shall meet the requirements of item 751.

800018-3.2 DEWATERING

The Contractor shall, at all times, provide and maintain in operation pumping and/or well point equipment for the complete dewatering of the excavation. No structure shall be permitted to be constructed in an excavation in which any amount of water flows or is pooled. The cost of dewatering shall be included in the unit price of the structure.

METHOD OF MEASUREMENT

800018-4.1

The Magnetic Flow Meter and Vault work items will not be measured for payment separately but will be measured as a LUMP SUM. This work shall include all structure and meter components and shall be complete as detailed in the plans and in these specifications.

The electrical work related to magnetic flow meter including, but not limited to junction boxes, cable/conduit, flow indicator/transmitter, remote indicator mounted on lift station controller and items required for a complete operational system shall be paid under the lump sum pay item AR800132.

BASIS OF PAYMENT

800018-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

The Magnetic Flow Meter and Vault will be paid for at the contract unit price per lump sum, complete and in place. The price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling, dewatering and placing of the materials; furnishing and installation of such specials and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

ITEM AR800018 MAGNETIC FLOW METER AND VAULT PER LUMP SUM

ITEM AR800020 BORING AND JACKING

DESCRIPTION

800020-1.1

Under this item, the Contractor shall furnish all labor, equipment and materials necessary to install 10" sanitary sewer in a 18" steel casing pipe, bored and jacked into place under pavements at the locations shown on the plans

MATERIALS

800020-2.1

At the locations shown on the drawings, sanitary sewer shall be installed in a steel casing pipe. The steel casing pipe shall be bituminous coated and shall be of leakproof construction, capable of withstanding the anticipated loadings. The steel casing pipe shall have a minimum yield strength of 35,000 psi and shall meet the requirements of ASTM A-139, Grade B. Casing shall be delivered to the jobsite with beveled ends to facilitate field welding. The minimum wall thickness of the steel casing pipe shall be .312".

Casing pipe diameter shall be such that there is a minimum of 4" clearance between the largest diameter of the carrying pipe being installed and the minimum inside diameter of the casing pipe including welds.

To facilitate the installation of the inner pipe, that pipe shall be fitted with at least three casing chocks per pipe length. The casing chocks shall be made of corrosion resistant materials and shall have a friction coefficient of 0.12. The casing chocks shall be Model 4810 as manufactured by Power Seal Pipeline Products Corporation of Wichita Falls, Texas, or equal.

CONSTRUCTION METHODS

800020-3.1

At the locations shown on the drawings, the Contractor shall install the pipe in a steel casing pipe. The steel casing pipe shall be installed by boring (augering) and jacking the casing pipe.

Casing pipe shall be so constructed as to prevent leakage of any substance from the casing throughout its length. Casing shall be installed so as to prevent the formation of a waterway under the pavement, and with an even bearing throughout its length, and shall slope to one end.

Boring and jacking shall consist of pushing the casing pipe with a boring auger rotating within the pipe to remove the spoil. When augers, or similar devices, are used for pipe emplacement, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed more than ½ inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.

The use of water or other liquids to facilitate casing emplacement and spoil removal is prohibited.

Plans and descriptions of the arrangement to be used shall be submitted to the Engineer for review. Sections of steel casing pipe shall be butt welded, full circumference in conformance with AWWA C-206, "Field Welding of Steel Water Pipe".

If any obstruction is encountered during installation to stop the forward action of the pipe, and it becomes evident that it is impossible to advance the pipe, operations will cease and the Engineer shall be notified at once. Contractor shall continue jacking operations on a regular basis to prevent cohesive freezing of the casing pipe.

If water is encountered, pumps of sufficient capacity to handle the flow shall be maintained at the site and shall be in constant attended operation on a 24-hour basis until its operation can be safely halted. When dewatering, close observation shall be maintained to detect any settlement or displacement of the embankment.

All operations shall be conducted so as not to interfere with, interrupt, or endanger the operation of traffic or air traffic, nor damage, destroy, or endanger the integrity of pavements. Operations will be subject to highway and airport inspection at any and all times.

Contractor shall maintain jacking and receiving pits in a neat, workmanlike, dry and stable manner. The bottom of the pit shall be lined with aggregate and rails for jacking machines and shall be carefully set to the proper line and grade. Contractor shall provide sheeting or shoring for the jacking and receiving pits or by other acceptable methods to protect against caving or sloughings. The pits shall be secured by temporary fencing and lighted barricades to prevent unauthorized or accidental entry. The Contractor's equipment shall not be placed and stored in a location that would obstruct or otherwise interfere with the adjacent roadway/airport operations. Prior to commencement of the work, the Contractor shall secure field verification of all utility clearances.

After the casing pipe has been properly installed, the Contractor shall install the carrying pipe within the casing in strict accordance with the manufacturer's recommendations.

Chocks shall be attached to the carrying pipe to facilitate installation and adequate pipe bearing support. Adequate measures shall be taken to prevent structural damage to the pipe. The carrying pipe shall be installed so as to be electrically isolated from the casing pipe.

After satisfactory pressure and leakage testing, the ends of the steel pipe shall be sealed with concrete.

Backfilling of the jacking pits and receiving pits shall be per item 152 and 701, respectively, of these specifications.

METHOD OF MEASUREMENT

800020-4.1

Boring and jacking shall be measured by the lineal foot of steel casing with sanitary sewer in place as measured from end of casing pipe to end of casing pipe. Sanitary sewer pipe will be measured separately.

BASIS OF PAYMENT

800020-5.1

Boring and jacking shall be paid for at the contract unit price per lineal foot for BORING AND JACKING, which shall be full compensation for all material and equipment required to furnish and install casing pipe, dewatering, and restoration of the jacking pit and receiving pit areas, and shall include all labor, equipment, tools and other incidentals necessary complete this work.

Backfill of jacking pits and receiving pits shall not be paid for separately but shall be included in the unit bid price of boring and jacking.

Payment will be made under:

ITEM AR800020 BORING AND JACKING – PER LINEAL FOOT.

ITEM 800053 – SOIL GUARD

DESCRIPTION

800053-1.1

This item consists of the application of a bonded fiber matrix to provide erosion control as shown on the plans or as directed by the Engineer.

MATERIALS

800053-2.1

The erosion materials used shall be Weyerhaeuser SOIL GUARD, or approved equal. When considering equals, it shall be the IDA Materials Engineer's sole authority to determine equals. Substitute non-conforming materials with credit will not be considered.

CONSTRUCTION METHODS

800053-3.1

All erosion materials shall be placed in accordance with the manufacturer's recommendations. Applicators shall be certified by the manufacturer. Proof of written certification shall be provided to the Resident Engineer prior to installation.

METHOD OF MEASUREMENT

800053-4.1

Soil Guard application shall be measured in square yards on the basis of the actual surface area acceptably mulched.

BASIS OF PAYMENT

800053-5.1

ADD:

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

Payment will be made at the contract unit price per square yard for soil guard mulching. This price shall be full compensation for furnishing all materials and for placing the materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

ITEM AR800053 SOIL GUARD PER SQUARE YARD

ITEM 800055 BITUMINOUS MILLING PLACEMENT

DESCRIPTION

ITEM 800055-1.1

This work shall consist of the incorporation of the bituminous pavement millings into the proposed subgrade areas as shown on the typical sections, cross-sections and as follows:

Structural fill placed directly under proposed crushed aggregate base course for the RIAT Road as shown on the plans or as directed by the Engineer.

MATERIALS

800055-2.1

The bituminous pavement millings shall be incorporated into the subgrade for the proposed pavement at the locations shown on the plans.

CONSTRUCTION METHODS

800055-3.1

The bituminous pavement millings shall be incorporated into the proposed subgrade areas in 6" maximum lifts and compacted with a vibratory roller to provide a uniform, stable and non-yielding base to the satisfaction of the Engineer.

800055-3.2

Any temporary stockpiling necessary in order to properly incorporate the bituminous pavement millings into the proposed subgrade areas shall be considered incidental to the work required under this pay item.

The existing bituminous millings shall be placed as subgrade for the RIAT Road as specified in the plans or as directed by the Engineer.

800055-3.3

Vibratory roller equipment shall meet IDOT Standard Specifications for Road and Bridge Construction Article 1101.01.

METHOD OF MEASUREMENT

800055-4.1

The quantity of the bituminous milling placement shall be measured by the number of cubic yards properly incorporated in-place into the subgrade areas, satisfactorily placed, compacted and graded to the lines and grades shown on the plans or as directed by the Engineer.

BASIS OF PAYMENT

800055-5.1

Payment shall be made at the contract unit price for Bituminous Milling Placement for the transportation, complete incorporation, grading and compaction of the existing bituminous millings into the proposed subgrade areas, and shall include all labor, tools, equipment and incidentals necessary to complete this item of work. Any work grading and recompacting of existing subgrade prior incorporating the material grindings as well as bringing the subgrade to the proper grade shall not be paid for separately but shall be considered incidental to Bituminous Milling Placement.

Payment will be made under:

ITEM AR800055 BITUMINOUS MILLING PLACEMENT - PER CUBIC YARD.

ITEM 800060 – AIR RELEASE VALVE AND VAULT

DESCRIPTION

800060-1.1

The Work to be accomplished under this Section consists of furnishing all labor, materials, equipment, and services necessary for the construction of an air release valve and vault as shown on the Contract Drawings. Included, but not limited to, is the clearing of the air release valve site, excavation, sheeting and bracing, backfill, compaction, finish grading and surface restoration. The facility components shall include, but not necessarily be limited to, valve vault, top section with cast-in frame and lid, manhole steps, short body sewage combination air valve and components, pipe saddle, and concrete support saddle; and any other items required to make the installation function per its design intent. All components shall be installed in, on, or near a pre-cast air release valve vault. The structures and dimensions shall be as shown on the Contract Drawings. For a detailed scope of the air release valve and vault, reference Appendix A specification section 15270.

MATERIALS

800060-2.1

Bedding and backfill shall meet the requirements of item 751.

CONSTRUCTION METHODS

800060-3.1

All pre-cast and cast-in-place concrete construction methods shall meet the requirements of item 751.

800060-3.2 DEWATERING

The Contractor shall, at all times, provide and maintain in operation pumping and/or well point equipment for the complete dewatering of the excavation. No structure shall be permitted to be constructed in an excavation in which any amount of water flows or is pooled. The cost of dewatering shall be included in the unit price of the structure.

METHOD OF MEASUREMENT

800060-4.1

The Air Release Valve and Vault work items will not be measured for payment separately but will be measured as a LUMP SUM. This work shall include all structure and valve components and shall be complete as detailed in the plans and in these specifications.

BASIS OF PAYMENT

800060-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

The Air Release Valve and Vault will be paid for at the contract unit price per lump sum, complete and in place. The price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling, dewatering and placing of the materials; furnishing and installation of such specials and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

ITEM AR800060	AIR RELEASE VALVE AND VAULT	PER LUMP SUM
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ITEM 800070 TRAFFIC CONTROL AND PROTECTION

DESCRIPTION

800070-1.1

This work shall consist of furnishing, installing and maintaining all signs, signals, temporary pavement markings, other required traffic control markings, barricades, warning lights, and other devices which are to be used to regulate, warn or guide traffic during construction of the improvements on the airfield and adjacent to public and private roadways. All work shall be as shown in the plans and shall be in conformance with the current edition of the Illinois Department of Transportation's Manual on Uniform Traffic Control Devices for Street and Highways.

CONSTRUCTION METHODS

800070-2.1

The Contractor will be required to furnish all traffic control devices necessary for the convenience and protection of aircraft, vehicular and pedestrian traffic. Whenever the operation of the Contractor endangers or interferes with vehicular traffic or pedestrians, as determined by the Engineer, the Contractor shall furnish any additional traffic control devices necessary to direct and protect his workmen at no extra cost to satisfy the requirements of the Engineer. The Contractor will be required to furnish the necessary flaggers as specified in the Plans or required by the Engineer on a continuous basis whenever construction operations are in progress.

The Contractor will be responsible for the proper location, installation and arrangement of all traffic control devices furnished by him. Whenever operations indicate that relocation of a proposed or existing traffic control device is advisable, as determined by the Engineer, the Contractor shall remove, relocate and reinstall the device in question.

All advance warning signs for lane closure, intermediate information signs and standard signs shall be installed in accordance with Illinois Highway Standard 702001. Cones will not be allowed as a traffic control device.

The "WORKERS" (W21-1a(0)-48) signs shall be replaced with symbol "Right or Left Lane Closed Ahead" (W4-2R or L (0)- 48) signs.

All advance warning signs and traffic control devices shall be removed or covered by the Contractor when such signs and devices are not in effect or at the direction of the Engineer.

The basic layout for traffic control devices will be in accordance with Standards 702001 as indicated in the Plans and Specifications

The Contractor will be responsible for the maintenance of all traffic control devices installed by him as designated in the Plans and Specifications or as required by the Engineer. The Contractor will provide surveillance of all barricades, barrels, warning signs and lights which he has installed on a 24-hour a day basis for each day of this contract. In the event of severe weather conditions, the Contractor shall be required to furnish any additional personnel required to maintain all traffic control devices as required by the Engineer. Surveillance shall mean checking control devices periodically, but not less than once every 12 hours.

The Contractor shall provide the City of Rockford with the name, address and telephone number of two (2) persons who will be responsible for maintaining the traffic control devices and who will be available to the City on an immediate basis 24 hours a day. If, for any reason, one or both of the persons become unavailable, the Contractor shall furnish the same information for other individuals who will be available.

The Contractor will be required to remove all traffic control devices which were furnished, installed or maintained by him under this contract and such devices shall remain the property of the Contractor upon said removal. All traffic control devices must remain in place until specific authorization for removal is received from the Engineer.

During any construction, a minimum of one twelve (12) foot traffic lane in each direction shall be maintained. Any deviation from this requirement shall be approved by the Engineer, with detour signing provided by the Contractor at the request of the Engineer. No extra compensation will be allowed for detour signing.

METHOD OF MEASUREMENT

800070-3.1

Measurement for this work will be on a lump sum basis. No distinction shall be made between traffic control on the airfield and traffic control adjacent to public and private roadways.

BASIS OF PAYMENT

800070-4.1

This work will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION, which price shall be payment in full for all labor, materials, transportation, handling and incidental work necessary to furnish, install, maintain and remove all traffic control devices as indicated on the Plans or in these Specifications and as directed by the Engineer.

Payment will be made under:

ITEM AR800070 TRAFFIC CONTROL AND PROTECTION PER LUMP SUM.

ITEM 800094 – DIVERSION STRUCTURE

DESCRIPTION

800094-1.1

The Work to be accomplished under this Section consists of furnishing all labor, materials, equipment, and services necessary for the construction of a diversion structure as shown on the Contract Drawings. Included, but not limited to, is the clearing of the diversion structure site, excavation, sheeting and bracing, backfill, compaction, finish grading and surface restoration. The facility components shall include, but not necessarily be limited to, cast-in-place concrete base slab and structure, grout, grating and supports, slide gates (2) and motorized operators (2), gate mounting, and supports, electrical connection; and any other items required to make the installation function per its design intent. All components shall be installed in, on, or near a cast-in-place diversion structure. The structures and dimensions shall be as shown on the Contract Drawings. For detailed descriptions pertaining to the metal fabrications, refer to Appendix A section 05500. For a detailed scope of electrical work, reference specification sections of Appendix A Division 16 - Electrical. For a detailed scope of the slide gates, reference Appendix A specification section 11285. For a detailed scope of the motorized gate operators, reference Appendix A specification section 11285.

MATERIALS

800094-2.1

Concrete shall meet the requirements of item 610.

800094-2.2

Steel reinforcement shall meet the requirements of item 751.

800094-2.3

Grating shall be as shown on the plans.

800094-2.4

Bedding and backfill shall meet the requirements of item 751.

CONSTRUCTION METHODS

800094-3.1

All cast-in-place concrete construction methods shall meet the requirements of item 751.

800094-3.2 DEWATERING

The Contractor shall, at all times, provide and maintain in operation pumping and/or well point equipment for the complete dewatering of the excavation. No structure shall be permitted to be constructed in an excavation in which any amount of water flows or is pooled. The cost of dewatering shall be included in the unit price of the structure.

METHOD OF MEASUREMENT

800094-4.1

The diversion Structure work items will not be measured for payment separately but will be measured as a LUMP SUM. This work shall include all structure components, cast-in-place concrete base slab and structure, grout, grating and supports, slide gates (2) and motorized operators (2), gate mounting, and supports, electrical connection and shall be complete as detailed in the plans and in these specifications.

The electrical work related to diversion structure including, but not limited to disconnects, junction boxes, cable/conduit, local operator stations, PLC-100 and items required for a complete operational system shall be paid under the lump sum pay item AR800131.

BASIS OF PAYMENT

800094-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

The Diversion Structure will be paid for at the contract unit price per lump sum, complete and in place. The price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling, dewatering and placing of the materials; furnishing and installation of such specials and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

ITEM AR800094 DIVERSION STRUCTURE PER LUMP SUM

ITEM 800126 – STORM WATER SAMPLING EQUIPMENT

DESCRIPTION

800126-1.1

The Work to be accomplished under this Section consists of furnishing all labor, materials, equipment, and services necessary for the construction of storm water sampling as shown on the Contract Drawings and as detailed in Appendix A section 16961. All components shall be installed in, on, or near a pre-fabricated building. For a detailed scope of electrical work, reference specification Appendix A sections of Division 16 - Electrical.

PVC Sample lines and pump in sampling manhole shall be incidental to this item.

MATERIALS

800126-2.1

For a detailed scope, see Appendix A specification section 16961.

CONSTRUCTION METHODS

800126-3.1

For a detailed scope, see Appendix A specification section 16961.

METHOD OF MEASUREMENT

800126-4.1

The storm water sampling equipment work items will not be measured for payment separately but will be measured as a LUMP SUM. This work shall include all required equipment components, piping, valves, fittings, pumps, electrical connection and shall be complete as detailed in the plans and in these specifications.

PVC Sample lines and pump in sampling manhole shall be incidental to this item.

BASIS OF PAYMENT

800126-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

The storm water sampling equipment will be paid for at the contract unit price per lump sum, complete and in place. The price shall be full compensation for furnishing and installation of all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and other structures as may be required to complete the item as shown on the plans; and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

ITEM AR800126 STORM WATER SAMPLING EQUIPMENT PER LUMP SUM

ITEM 800131 – STORM WATER SAMPLING BUILDING ELECTRICAL

DESCRIPTION

800131-1.1

The Work to be accomplished under this Section consists of furnishing all labor, materials, equipment, and services necessary for the electrical system for the storm water sampling building, diversion structure and sampling manhole as shown on the Contract Drawings. Included, but not limited to, the furnishing and installation of complete power distribution system, PLC-100, auto-alarm dialer, new electric service, electrical equipment at diversion structure, electrical equipment at sampling manhole, interior/exterior lighting system, environmental control system, wireway, grounding system, cabling/conduit between structures and building, and any other items required to make the installation function per its design intent. For a detailed scope of electrical work, reference specification sections of Appendix A Division 16 - Electrical.

MATERIALS

800131-2.1

All electrical equipment and components shall be in accordance with the appropriate sections of Appendix A Division 16- Electrical specifications and as detailed on the plans.

CONSTRUCTION METHODS

800131-3.1

The installation, commissioning and testing of all electrical systems and components shall be in accordance with the appropriate sections of Appendix A Division 16 – Electrical specifications and as detailed on the plans.

METHOD OF MEASUREMENT

800131-4.1

The storm water sampling building electrical work items will not be measured for payment separately but will be measured as a LUMP SUM. This work shall include but not limited to, the furnishing and installation of complete power distribution system, installation and programming of PLC-100, auto-alarm dialer, new electric service, electrical equipment at diversion structure, electrical equipment at sampling manhole, interior/exterior lighting system, environmental control system, alarm light, wireway, grounding system, cabling/conduits between diversion structure, sampling manhole, utility pole and storm water sampling building, and any other items required to make the installation function per its design intent.

The quantity for 4-way concrete encased duct and handholes shall be measured separately and shall be paid under pay items AR110504 and AR110610 respectively.

BASIS OF PAYMENT

800131-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not included on the Construction Progress Payment report until such submittals have been furnished.

The Storm Water Sampling Building Electrical will be paid for at the contract unit price per lump sum, complete and in place. The price shall be full compensation for furnishing all materials and for installation, commissioning and testing of all components as described herein and as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete an operational system.

Payment will be made under:

ITEM AR800131 STORM WATER SAMPLING BUILDING ELECTRICAL PER LUMP SUM

ITEM 800132 – CHEMICAL/ELECTRICAL BUILDING MODIFICATIONS

DESCRIPTION

800132-1.1

The Work to be accomplished under this Section consists of furnishing all labor, materials, equipment, and services necessary for the electrical system for the modifications of the existing chemical/electrical building, sanitary lift station and magmeter vault as shown on the Contract Drawings. Included, but not limited to, the furnishing and installation of complete sanitary lift station controller, auto-alarm dialer, circuit breakers in existing MCC and lighting panel, electrical equipment at sanitary lift station, electrical equipment at sampling manhole, alarm light, cabling/conduit between structures and existing building, and any other items required to make the installation function per its design intent. For a detailed scope of electrical work, reference specification sections of Appendix A Division 16 - Electrical.

MATERIALS

800132-2.1

All electrical equipment and components shall be in accordance with the appropriate sections of Appendix A Division 16- Electrical specifications and as detailed on the plans.

CONSTRUCTION METHODS

800132-3.1

The installation, commissioning and testing of all electrical systems and components shall be in accordance with the appropriate sections of Appendix A Division 16 – Electrical specifications and as detailed on the plans.

METHOD OF MEASUREMENT

800132-4.1

The chemical/electrical building modifications work items will not be measured for payment separately but will be measured as a LUMP SUM. This work shall include but not limited to, the furnishing and installation of complete power distribution system, installation and programming of sanitary lift station controller, auto-alarm dialer, alarm light, electrical equipment at sanitary lift station, electrical equipment at magmeter vault, cabling/conduits between sanitary lift station, magmeter vault and existing chemical/electrical building, and any other items required to make the installation function per its design intent.

The quantity for 4-way concrete encased duct and handholes shall be measured separately and shall be paid under pay items AR110504 and AR110610 respectively.

BASIS OF PAYMENT

800132-5.1

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not included on the Construction Progress Payment report until such submittals have been furnished.

The Chemical/Electrical Building Modifications will be paid for at the contract unit price per lump sum, complete and in place. The price shall be full compensation for furnishing all materials and for installation, commissioning and testing of all components as described herein and as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete an operational system.

Payment will be made under:

ITEM AR800132 CHEMICAL/ELECTRICAL BUILDING MODIFICATIONS PER LUMP SUM

ITEM 800195 STORM WATER SAMPLING BUILDING

DESCRIPTION

800195-1.1

The Contractor shall furnish all equipment, materials and labor necessary to furnish the new building as shown in the plans or as specified herein.

The electrical work related to this item and electrical/HVAC equipment inside the storm water sampling building shall not be included in this item.

EQUIPMENT AND MATERIALS

800195-2.1 GENERAL

The Packaged Building shall be furnished as site assembled or pre-erected as detailed on the plans and described below. The packaged Building shall be 16' x 12' Gable building as manufactured by Parkline, Inc. (located in Winfield, West Virginia) or equal. The Packaged Electrical Vault Building shall conform to the following requirements:

(a) General

The building covered by these specifications shall be of self-framing design utilizing the roof and wall panels as the primary structural supporting members.

Each building shall be supplied with all necessary component parts, including foundation anchors, to form a complete building system. All parts shall be new and free from any defects or imperfections.

The building width and length shall be measured from the outside of the building wall panels and the height of the building shall be the distance measured from the bottom surface of the base channel to the exterior juncture of the roof and sidewall panels.

b) Design Criteria

All buildings shall be designed in accordance with the applicable sections of the latest edition of the AISC "Specification for Structural Steel Buildings", the AISI "Specification for the Design of Cold-Formed Steel Structural Members" and the 2003 ICC [IBC] International Building Code with local amendments for type of building as applicable.

Each building shall be designed for the following loads, in addition to the stationary weight (dead load) of the building.

- 1) The vertical Live Load of the building shall be not less than 40 pounds per square foot applied on the horizontal projection of the roof.
- 2) The design Wind Load of the building shall be not less than 100 miles per hour and shall be distributed and applied in accordance with the applicable edition of the "International Building Code" published by the International Code Council.

All combining and distributing of auxiliary equipment loads on the building system shall be done in accordance with the applicable section of the "International Building Code" published by the International Code Council.

Note: The building designer is responsible for advising the building supplier of any auxiliary loads intended to be imposed on the building covered by these specifications.

It is the responsibility of the contractor to notify the manufacturer of any building code (s) in effect for any particular building or provide the manufacturer with the telephone number of the building inspector with jurisdiction over the building site.

c) Roof Panel Design

The building shall have a gable roof with a minimum slope of 2" in each 12" of building width. Roof panels shall be fastened to the eave cap with 1/4" diameter Type 430 stainless steel bolts through factory punched holes. The ridge of the roof shall be a welded double channel assembly capped with a nominal 20 gauge steel cover.

Strap or channel bracing components shall be placed across the building width to allow transmission of the horizontal wind loads. All wind bracing components shall be of nominal 14 gauge galvanized steel.

Where required for proper transmission of lateral wind loads, structural frame wind bents shall be installed. Wind bents shall consist of a prime painted column and rafter bolted assembly made of steel conforming to ASTM A-36 specifications.

The interlocking panel roof system shall extend a minimum of 8" over the endwall panels and a minimum of 6" over the sidewall panels of the building except 6" high rib roof panels shall have no endwall overhang.

The building roof liner shall be finished with nominal 26 gauge factory painted rake trim having matching ridge and eave cornices. Color shall be as selected by the Owner.

Roof panels shall be supplied in a single continuous length from eave line to ridge line and shall be designed to tightly interlock so that no fasteners are required at intermediate points along the panel side laps.

Roof panels shall be a maximum of 16" and a minimum of 12" wide with a smooth surface between the interlocking side ribs. The interlocking ribs shall be a minimum 3" high and shall be turned upward. All roof panels shall be factory punched for connection at the eave line of the building.

There shall be no fastener penetrations through the roof covering except at eave lines and ridge lines.

Roof panels shall be nominal 24 gauge steel coated on both sides with a coating of corrosion resistant aluminum zinc alloy conforming to ASTM A 792 specification with coating conforming to AZ55 (55%) standard by a continuous hot dipping process. Coating weight shall be a minimum of 0.50 oz. of aluminum-zinc alloy per square foot of coated sheet equivalent to about 0.8 mil thickness on each side. Minimum yield strength of panel material shall be 50,000 PSI.

a) Wall Panel Design

Exterior wall panels of the building shall be a single continuous length from the base channel to the roof line of the building at the sidewalls and endwalls of the building except where interrupted by wall openings.

Wall panels shall be maximum 16" width with a 3" deep inward turned interlocking side rib. Wall panels shall contain two 3/4" deep by 3 1/8" wide fluted recesses, each starting 2 7/16" from each panel edge.

Wall panels shall be fastened internally to the base channel and eave cap of the building with 3/8" diameter electro-galvanized machine bolts placed within the panel interlock. The fastening system shall be designed so that no wall fasteners are exposed on the exterior surfaces of the walls.

Wall panels shall be nominal 24 gauge galvanized steel conforming to ASTM A 653-96 specifications with the galvanized coating confirming G90 (1.25 oz. commercial) standards. Minimum yield strength of panel material shall be 40,000 PSI. Panel material shall be embossed with a random pattern pebble embossure of approximately .007-.008 depth.

The wall panel color coating shall carry a low fire hazard rating equal to a Class 1 material as defined by Factory Mutual. The panel coating shall have achieved a Flame Spread Index of 0 and a Fuel Contributed Index of 5 or less when tested in accordance with ASTM E-84 test procedures.

e) Color Coatings

All exterior surfaces of the galvanized steel wall panels and exterior trim shall receive two (2) factory, roller applied, paint coats having a combined coating thickness of 0.8 to 1.2 mils of dry film thickness. The finish coat for wall panels shall be a siliconized polyester, color shall be as selected by the Owner.

Exterior color coatings shall meet the following performance standards after 10 years continuous exposure in normal vertical atmospheric conditions.

- 1) Panels shall show no evidence of blistering, peeling or chipping.
- 2) Panels shall not show surface chalking in excess of the No. 8 rating when measured per the American Society for Testing and Materials (ASTM) D659.
- 3) Panels, after cleaning, shall not show color change in excess of five (5) NBS units when measured in accordance with the ASTM D 2244 standards.

The above performance standards shall not apply where panels have been damaged by fire, radiation or other physical damage.

f) Structural Framing

Angle or channel bracing components shall be placed across the building width to allow transmission of horizontal wind loads. All wind bracing components shall be of nominal 14 gauge galvanized steel. Where required for proper transmission of lateral wind loads, structural frame wind bents shall be installed. Wind bents shall consist of a bolted column and rafter assembly of steel conforming to ASTM A 36 specifications.

g) Door Specifications

All doors shall be 1 3/4" thick flush construction. Door leaves shall be nominal 20 gauge galvanized steel, reinforced by lamination to a small cell honeycomb core and manufactured in accordance with ANSI / SDI – 100, Grade I, Model 1 (STC rating 30 and U value .41). The hinge reinforcement shall be minimum 7 gauge and the lock reinforcement shall be nominal 16 gauge. Door frames shall be 4 3/4" deep, double rabbet type, of minimum 16 gauge galvanized steel. All leaves and frames shall be factory painted with one coat of baked on primer. All surfaces of the door shall receive two (2) factory, roller applied, paint coats having a combined coating thickness of 0.8 to 1.2 mils of dry film thickness.

h) Lock-In Wall Liner Plus

The interior of the building shall be lined with a factory assembled insulated metal liner having no exposed fasteners except at the matching base, ceiling and accessory trim.

Liner panels shall be 16" wide and shall be nominal 26 gauge embossed galvanized steel, prepainted white. Insulation shall be noncombustible, nominal 1" thick, 2 # minimum density fiberglass laminated to the liner panel.

The void between the exterior wall panel and the lock-in plus liner shall be insulated with a 3 1/2" thick unfaced fiberglass insulation meeting local building code requirements.

i) Ceiling

The metal ceiling system shall consist of 3" deep, 16" wide interlocking panels of nominal 24 gauge embossed galvanized steel, factory painted white. The ceiling system shall be supported at its perimeter by concealed angles and self drilling fasteners. The ceiling system shall be furnished complete with all necessary connectors and fasteners. Metal ceiling shall be insulated with 16" wide, 3 1/2" thick, unfaced fiberglass insulation laid in between the panel ribs with an additional 16" wide, 3 1/2" thick unfaced fiberglass insulation layer placed perpendicular to the bottom layer meeting local building code requirements.

j) Miscellaneous

Contractor shall provide one (1) Halon charged fire extinguisher of adequate size (10 lb. minimum) useable on Class A, B and C fires.

800195 – 2.25 Shop Drawings

In addition to the requirements of Section 60 Paragraph 60-09 of the General Provisions of Division 1 of these specifications, shop drawings shall also be submitted for review for all items specified in Paragraph 109-2.1.

The building supplier shall furnish a complete set of building erection drawings illustrating step by step sequence for the erection of the building. The erection drawings shall be prepared specifically for the building covered by these specifications showing the exact location of all roof and wall accessories and the exact anchor bolt locations required for each accessory.

CONSTRUCTION METHODS

800195-3.10 GENERAL

The Contractor shall furnish all labor, materials and services necessary for and incidental to the completion of all work as shown on the drawings and as specified herein. All machinery and equipment owned or controlled by the Contractor, which he proposes to use on the work, shall be of sufficient size to satisfactorily meet the requirements of the work and conform to the equipment specifications. All work shall be subject to the inspection and approval of the Engineer and local building inspector.

METHOD OF MEASUREMENT

800195-4.1

The Storm Water Sampling Building shall be measured for payment as a lump sum quantity, constructed as a complete unit ready for operation and accepted by the Engineer

BASIS OF PAYMENT

800195-5.1

ADD:

Payment will be at the contract unit price per lump sum as described below, complete and accepted for each item. This price shall be compensation in full for all preparation, assembly, materials, labor, equipment, tools and incidentals necessary to complete the item as specified herein or as directed by the Engineer.

Payment will be made under:

ITEM AR800195	STORM WATER SAMPLING BUILDING	PER LUMP SUM
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ITEM AR800196 BUILDING FOUNDATION AND FLOOR

DESCRIPTION

800196-1.1 GENERAL

The building is constructed on continuous concrete spread footing and foundation walls with concrete slab on grade. The floor consists of a concrete slab on grade.

MATERIALS

800196-2.1 CONCRETE

All concrete work shall conform to the requirements of Item 610 Structural Portland Cement Concrete.

800196-2.2 FLOOR/PAD FINISH

The building floor shall receive a steel trowel finish.

800196-2.3 CONCRETE FLOOR SEAL

Concrete floors shall be sealed with Sealtight CS-309 curing compound by W.R. Meadows, or equal, per the manufacturer's specifications. All interior and exterior concrete floor slabs shall receive two coats of Sealtight TIAH, or equal, per the manufacturer's specifications. Curing compound and sealer shall be compatible with each other.

CONSTRUCTION METHODS

800196-3.1

The Contractor shall note that the concrete floor shall be placed on a minimum of six (6) inches of IDOT CA-6 material as specified under Item 208 AGGREGATE BASE COURSE and compacted to not less than 98% of maximum density at optimum moisture as determined by compaction control tests specified in Division VII for aircraft with gross weights of less than 60,000 lbs. (Standard Proctor ASTM D698).

Compacted granular material shall be used as backfill on the inside of foundation walls, around footings and at other locations shown on the drawings. Compacted granular material shall be required on the outside of foundation walls where pavements, sidewalks and concrete pads are located adjacent to the building, and where piping passes through the foundation wall. Trenches below the 6" base course and under the proposed floor slab or footings shall be backfilled with compacted granular material. Granular material shall be approved by the Engineer and shall be compacted with mechanical tampers to a minimum of 95% of the maximum standard Proctor dry density.

The Contractor shall note the different types of finishes on formed and unformed concrete surfaces. All exposed exterior walls to 1 foot below finish grade and all exposed interior walls as noted on the drawings shall receive a rubbed finish.

The Contractor shall submit a concrete pouring sequence to the Engineer for review. The pouring sequence shall be submitted with the shop drawings.

The Contractor shall build in all anchors, toggles, bolts, flashing, wall plugs, nailing strips, beams, frames, etc. as may be required. These materials shall be placed according to the directions of those who furnish them or as directed by the Engineer.

METHOD OF MEASUREMENT

800196-4.1

The Building Foundation and Floor will be measured for payment as a lump sum quantity, constructed in place and accepted as a complete unit. The cost of all granular material shall not be paid for separately, but shall be considered incidental to BUILDING FOUNDATION AND FLOOR.

BASIS OF PAYMENT

800196-5.1

Payment shall be made at the contract lump sum price bid for "BUILDING FOUNDATION AND FLOOR." Payment will be based on completed work performed in strict accordance with the drawings and specifications. This price shall be full compensation for furnishing, preparing and transporting of these materials and for all labor, equipment, tools, and incidentals necessary to complete this item, including excavation, backfill, compacted granular materials, reinforcement, foundation insulation, curing and finishing.

Payment will be made under:

ITEM AR800196 BUILDING FOUNDATION AND FLOOR – PER LUMP SUM

APPENDIX A

CHICAGO ROCKFORD INTERNATIONAL AIRPORT
ROCKFORD, ILLINOIS

NORTHWEST CARGO APRON AND SITEWORK – PHASE 2

APPENDIX SPECIFICATIONS

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DIVISION 5 - METALS
Section 05500 – Miscellaneous Metals

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Provide all labor, materials, equipment, and services required to complete the installation of all miscellaneous metals in accordance with the Contract Documents.
- B. Miscellaneous metals shall be defined as all materials custom fabricated from structural shapes.
- C. The work shall include, but not be limited to, the following principal items:
 - 1. Miscellaneous steel framing.
 - 2. Hangers, supports, closures.
 - 3. Expansion anchors, adhesive anchors, anchor bolts.

1.02 RELATED WORK

- A. Section 05520 – Handrails and Railing.

1.03 REFERENCE TO STANDARDS

- A. The materials, methods, and installation of the work under this section of the Specifications shall conform to applicable standards of the following:
 - 1. AWS – American Welding Society.
 - 2. AISC – American Institute of Steel Construction.
 - 3. NAAMM – National Association of Architectural Metal Manufacturers.
 - 4. Engineering Data for Aluminum Structures, Aluminum Association, Inc.

1.04 QUALITY ASSURANCE

- A. All work must be first class in all respects and any members not representing a finished and workmanlike appearance will be rejected. All finished members shall be free from twists, bends, other distortions and open joints.
- B. Verify all dimensions given on the drawings and make such field measurements as are necessary to lay out this work properly. The Contractor shall be fully responsible for accuracy of all measurements and layout of the work.
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting wherever taking field measurements before fabrication might delay work.

- D. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- E. See concrete, masonry, mechanical, electrical and other Sections of these Specifications for installation of inserts and anchorage devices.
- F. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- G. Codes and Standards: Comply with the provisions of the following codes, standards and specifications, except as otherwise shown and specified.
 - 1. AISC – “Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings”, and including “Commentary of the AISC Specification”.
 - 2. AISI – “Specification for the Design of Cold-Formed Steel Structural Members”.
 - 3. AWS – “Code for Welding in Building Construction”.
 - 4. ASTM A6 – “General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use”.
- H. AISC Qualification for Welding Work: Qualify welding processes and welding operators in accordance with AWS “Standard Qualification Procedure”.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Use care in storing, handling and erecting all material, and support same properly at all times to insure that no piece will be bent, twisted or otherwise damaged. Material damage shall be corrected at the Contractor’s expense, to the approval of the Engineer before final acceptance.

1.06 SUBMITTALS

- A. Shop drawings shall be submitted in accordance with Section 01330 of Division 1 of these Specifications.
- B. Prepare complete shop drawings and erection drawings based on current AISC Specifications. Preparation of shop drawings shall not be sublet by the steel fabricator unless written approval is obtained from the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS AND COMPONENTS

- A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Structural Steel Plates, Shapes and Bars: ASTM A36.
- C. Stainless Steel Sheet, Strip, Plate and Flat Bar: ASTM A666, Type 304.
- D. Structural Steel Tubing: Hot-formed, welded or seamless, ASTM A500, Grade B, 46 ksi.
- E. Cold-Drawn Steel Tubing: ASTM A512, sink drawn, butt welded, cold-finished and stress-relieved.
- F. Hot-Rolled Carbon Steel Bars (and Bar-Size Shapes): ASTM A575, grade as selected by fabricator.
- G. Cold-Finished Steel Bars: ASTM A108, grade as selected by fabricator.
- H. Hot-Rolled Carbon Steel Sheets and Strips: ASTM A568 and ASTM A569; pickled and oiled.
- I. Cold-Rolled Carbon Steel Sheets: ASTM A366.
- J. Galvanized Carbon Steel Sheets: ASTM A526, with 1.26 oz. "Commercial" galvanizing, ASTM A525.
- K. Gray Iron Castings: ASTM 48, Class 30.
- L. Aluminum Castings: ASTM B26, Alloy G4A, Condition F.
- M. Aluminum Plates and Angles: Aluminum Alloy 6061-T6.
- N. Steel Pipe: ASTM A53; type as selected; Grade A; black finish unless galvanizing is required; standard weight (Schedule 40), unless otherwise shown or specified.
- O. Concrete Inserts: Threaded or wedge types, galvanized ferrous castings, either malleable iron ASTM A47 or cast steel ASTM A27. provide bolts, washers and shims as required, hot-dip galvanized ASTM A153.

- P. Drilled-In Anchors. All drilled-in concrete anchors shall be adhesive chemical anchor type or expansion anchor type, as manufactured by Hilti, ITW or approved equal. Use of expansion anchor devices shall be permitted only where shown on the drawings and where required for attachment of miscellaneous equipment. All other applications shall be adhesive chemical anchors. There will be no exceptions to this requirement. Drilled-in anchors shall be a minimum of 3/4" diameter, unless noted otherwise, with minimum embedment as required by manufacturer, or shown on the drawings, whichever is greater.
- Q. Masonry Anchorage Devices: Expansion shields complying with FS FF-S-325; as follows:
1. Provide lead expansion shields for machine screws and bolts 1/4" and smaller; head-out embedded nut type, single unit class, Group I, Type 1, Class 1.
 2. Provide lead expansion shields for machine screws and bolts larger than 1/4" in size; head-out embedded nut type, multiple unit class, Group I, Type 1, Class 2.
 3. Provide bolt anchor expansion shields for lag bolts; zinc-alloy, long-shield anchors class, Group II, Type 1, Class 1.
 4. Provide bolt anchor expansion shields for bolts; closed-end bottom bearing class, Group II, Type 2, Class 1.
- R. Toggle Bolts: Tumble-wing type, complying with Federal Specification FF-B-588, type, class and style as required.
- S. Anchor Bolts: Conform to ASTM A36 or ASTM A307.
1. Galvanize after fabrication, ASTM A153.

2.02 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for type, grade and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A, ASTM 325, or ASTM A276, Type 304 bolts.
- C. Lag Bolts: Square head type, Federal Specification FF-B-561.
- D. Machine Screws: Cadmium plated steel, Federal Specification FF-S-92.
- E. Wood Screws: Flat head carbon steel, Federal Specification FF-S-111.
- F. Plain Washers: Round, carbon steel, Federal Specification FF-W-92.
- G. Lock Washers: Helical spring type carbon steel, Federal Specification FF-W-84.

2.03 FABRICATION – GENERAL

A. Workmanship:

1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Weld corners and seams continuously, complying with AWS recommendations. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces. All welds shall be made with E70XX electrodes and shall conform to AWS Specifications.
4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat-head (countersunk) screws or bolts.
5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices as shown and as required to provide adequate support for intended use.
6. Cut, reinforce, drill and tap miscellaneous metal work as required to provide adequate support for intended use.
7. Cut, reinforce, drill and tap miscellaneous metal work as required to receive finish hardware and similar items.
8. Use hot-rolled steel bars for work fabricated from bar stock, unless shown or specified to be fabricated from cold-finished or cold-rolled stock.
9. Verify dimensions on site prior to shop fabrication.
10. Fabricate items with joints tightly fitted and secured.
11. Fit and shop assemble in largest practical sections, for delivery to site.
12. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.
13. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
14. Make exposed joints butt tight, flush and hairline.

15. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

B. Galvanizing:

1. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
 - a. ASTM A153 for galvanizing iron and steel hardware.
 - b. ASTM A123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.

2.04 WELDING

- A. All welding, whether ship or field, shall be done by the electric-arc method. Welders and welding machine operators shall be qualified as capable for type of work as prescribed by AWS B 3.0, Welding Procedure Qualification, or other means acceptable to the Engineer.
- B. Welding shall be done in accordance with the requirements of the current "Code for Arc and Gas Welding in Building Construction" of the American Welding Society. Welding electrodes shall conform to E70 Series of ASTM A233 "Specification for Mild Steel Arc-Welding Electrodes."

2.05 BOLTED CONNECTIONS

- A. All materials and fabrication methods shall be in accordance with the "Specifications for Structural Joints Using ASTM A325 Bolts," as published by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
- B. High tension bolted connections shall be bearing type. Design shall be based on allowable stress with threads in the shear plane. All high strength bolts shall have hardened washers under the turn element.
- C. No other types of bolts shall be allowed on the jobsite during steel erection.

2.06 SURFACE PREPARATION AND SHOP PAINTING

- A. Prepare all structural steel surfaces for shop painting by commercial sandblasting in accordance with SSPC-10 (near white blast).
- B. Immediately after sandblasting (on the same day) apply one shop coat of primer to all structural steel surfaces, except those surfaces which will be field welded, or those to be galvanized. All areas within two (2) inches of these field welds shall not be painted.

- C. The shop coat of primer shall conform to the brand or trade name, the coverage rate, the dry film thickness, and all other requirements as specified under Section 09900 – Painting.
- D. Each structural steel member shall be clearly matchmarked in coordination with the erection shop drawings so as to aid the steel erection.
- E. After the structural steel is erected, all field welds, areas around field welds and all scratches and mars of the paint shall be power tool cleaned per SSPC-SP3 and painted as called for in Section 09900.
- F. Anchors, sleeves and metal parts built into masonry or concrete shall be galvanized or coated with a bituminous paint.
- G. Hot-dip galvanizing for products fabricated from steel shapes, plates, bars and strips shall comply with ASTM A123. Except for bolts and nuts for field assembly, galvanize all subassemblies immediately after fabrication. Hardware shall be galvanized in compliance with ASTM A153. Galvanized materials which require repair shall be painted with a high zinc dust content paint complying with Military Specification MIL-P-2103S (Ships).
- H. Aluminum in direct contact with dissimilar metals, concrete, or masonry shall be coated with a heavy-bodied bituminous paint or covered with non-absorptive insulating tape or gasket.

2.07 LOOSE LINTELS (RESERVED)

2.08 STEEL FRAMING (RESERVED)

2.09 PIPE RAILINGS

- A. Pipe railing shall be 1-1/2" ID Schedule 40 Aluminum as specified in Section 05520 – Handrails and Railings.

2.10 PIPE BUMPERS

- A. Pipe bumpers shall be fabricated of standard steel pipe, as detailed on the drawings. Pipe bumpers shall be set and filled with concrete.

2.11 ANCHOR BOLTS AND ADHESIVE ANCHORS

- A. All steel anchor bolts shall be as detailed on the plans and shall be ASTM A307, with hardened washers and standard nuts, all shall be Hot Dip Galvanized.

2.12 ALUMINUM LADDERS (RESERVED)

2.13 ALUMINUM HATCHES

- A. The access doors in the top slab of the pump station shall be 1/4" aluminum channel with anchor flange around the perimeter. Door leaf shall be 1/4" aluminum diamond plate reinforced with aluminum stiffeners as required. The door shall open to 90 degrees and lock automatically in that position. Doors shall be built to withstand a live load of 300 pounds per square foot and equipped with a snap lock and recessed hasp covered by a hinged lid flush with surface. Mill finish with bituminous coating to be applied to exterior of frame by manufacturer. Hardware shall be stainless steel. Installation shall be in accordance with manufacturer's instructions. The access doors shall be by Halliday Products as described in the hatch schedule, or equal.

Hatch Schedule

<u>Location</u>	<u>Opening Dimensions (ft)</u>		<u>Series</u>	<u>Hinges</u>	<u>Quantity</u>
	<u>Length</u>	<u>Width</u>			
Sanitary Lift Station	3'-0	3'-0	S1S	North	3
Sanitary Lift Station	5'-0	3'-0	S1S	South	1
Sanitary Lift Station	5'-0	3'-6	S1S	South	2

PART 3 EXECUTION

3.01 INSTALLATION AND ERECTION

- A. Set all items accurately to the lines and elevations shown on the drawings.
- B. If members do not fit properly in the field, any new necessary holes shall be drilled. Material shall be cut with a hacksaw. No cutting with torch will be allowed except where specifically approved by the Engineer. Misfit holes shall be plug welded prior to drilling of new holes.
- C. Warped or bent members shall be straightened to the approval of the Engineer or shall be replaced with new material before being erected.
- D. All miscellaneous metal items shall be completely fabricated, include all parts, and be complete with bolts, anchor clips, etc. ready for installation. All work shall be erected to the proper lines and elevations in correct relation to the adjoining work.
- E. Unless otherwise shown on the drawings, secure miscellaneous metal items by means of field bolting, welding, epoxy anchoring system or similar connections. Methods of attachment shall be concealed wherever possible.
- F. Throughout the work, anchors and inserts shall be provided wherever possible for building in the adjoining work. Where lugs are shown or specified for building into adjoining masonry, the parts having lugs shall be erected in place before the masonry is built. Elsewhere, the work shall be brought to the facility in as large pieces as practicable and attached with anchors or inserts during the erection.

- G. All connections fixed to sleeves shall have members inserted into the sleeve to the proper distance, wedged tight with metal wedges, and the surrounding space shall be poured full of lead to a finish flush with the adjoining surface.
- H. There shall be no "burning" in the field without the written permission of the Engineer. If consent is given, finish burned members to an acceptable appearance, the equal of a sheared finish. Burning of holes will not be permitted either in the shop or in the field.
- I. Erect structural steel in compliance with the AISC "Specification for the Design, Fabrication & Erection of Structural Steel for Buildings" and the AISC "Code of Standard Practice."
- J. Check all levels and elevations prior to setting leveling plates. Shim with steel shims where necessary to prevent displacement of setting grout. Unless otherwise indicated, the entire area under bearing surfaces shall be grouted solid with non-shrink grout, as specified in Section 03300.
- K. Prior to assembling members, clean bearing surfaces and surfaces to be in permanent contact to remove dirt and scale.
- L. Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint and paint exposed areas with the same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

3.02 CLEAN UP

- A. The site shall be maintained free of accumulations of dunnage and rubbish resulting from erection work and upon completion, all such rubbish, as well as tools and equipment, shall be removed from the site.

END OF SECTION 05500

DIVISION 5 - METALS
Section 05520 - Handrails And Railings

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum pipe handrails, posts and fittings.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 05500 - Metal Fabrications.

1.03 REFERENCE TO STANDARDS

- A. ASTM B209, 6061-T6 - Plate and Sheet.
- B. ASTM B247, 6061-T6 - Die and Hand Forgings.
- C. ASTM B429, 6061-T6 - Extruded Structural Pipe and Tube.
- D. ASTM B221, 6061-T6 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- E. ASTM B483, 6061-T6 - Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications.
- F. ASTM B26, 356-T6 - Castings.
- G. ASTM A53, Grade B, Type S, Schedule 40 - Steel pipe.

1.04 DESIGN REQUIREMENTS

- A. Comply with ASTM E985 based on the following:
 - 1. Testing per ASTM E894 and E935.
- B. Design, fabricate and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.
 - 1. Top Rail of Guardrail Systems: Capable of withstanding concentrated load of 200 lb applied at any point and in any direction and capable of withstanding a uniform load of 50 pounds per lineal foot applied horizontally at right angles to the top rail. Concentrated load shall not be assumed to act concurrently with uniform loads.
 - 2. Handrails Not Serving as Top Rails: Capable of withstanding concentrated load of 200 lb applied at any point and in any direction and capable of

withstanding a uniform load of 50 pounds per lineal foot applied horizontally at right angles to the top rail. Concentrated and uniform loads shall not be assumed to act concurrently.

3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lb applied to one sq. ft. at any point in the system including panels, intermediate rails, balusters, or other elements composing the infill area. Load shall not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.

- C. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.05 SUBMITTALS

- A. Submit under the provisions of Section 01330.
- B. In addition to product data, submit following:
 1. Shop drawings showing railing layout and details of components.
 2. Samples of each type of metal finish indicated.
 3. Test reports from independent testing laboratory evidencing compliance with ASTM E985.

1.06 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Blum: Julius Blum & Co., Inc.
- B. Other acceptable manufacturers offering equivalent products.
 1. Braun: J.G. Braun Co.
 2. Hollaender
 3. Moultrie Manufacturing Co.
- C. Other manufacturers may be considered as equal. Submit proper documentation to Engineer for review of manufacturer's qualifications prior to fabrication.

2.02 ALUMINUM RAILING SYSTEM

- A. Rails and Posts: 1-1/2 inch inside diameter, Schedule 40, extruded tubing conforming to ASTM B221.
 - 1. Handrail consists of vertical posts and three horizontal rails.
 - a. Posts shall be spaced not greater than six (6) feet apart except at end posts where spacing shall not exceed four (4) feet.
 - b. Horizontal rails shall be spaced as follows: top rail 3'-6" from top of walking surface, intermediate rail 2'-4" from walking surface, and bottom rail 1'-2" from walking surface except at stairs where top rail shall be 2'-10" from tread nosing, the intermediate rail will be 1'-11" from tread nosing, and bottom rail shall be 1'-6" from tread nosing.
- C. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast aluminum.
- D. Mounting handrail to structural steel members or concrete.
 - 1. All handrail posts shall be mechanically attached to structural steel or concrete. Attachment shall be made utilizing standard brackets and flanges of cast or formed aluminum or a plate welded to the handrail posts in accordance with the specifications for Aluminum Structures (min. plate size 1/2" x 2" x 6"). Handrail manufacturer shall certify that mechanical attachments meet or exceed the design requirements (loading) of 1.04B of this specification section.
 - 2. All mechanical attachments to structural steel shall be made with a minimum of two (2) 1/2" diameter stainless steel bolts.
 - 3. All mechanical attachments to concrete shall be made with a minimum of three (3) 3/8" diameter stainless steel expansion anchors, installed per manufacturer's recommendations.
 - 4. All aluminum surfaces of railings in contact with concrete shall be coated with bitumastic paint. All aluminum surfaces of railings in contact with steel or dissimilar metal shall be isolated by rubber or neoprene gaskets.
- E. Splice Connectors: Concealed mechanical fasteners and fittings. Fabricate splice joints for field connection using epoxy structural adhesive.
- F. Fasteners: Same material as fastened metal; concealed unless otherwise indicated or unavoidable and standard with systems indicated.
- G. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- H. Bolts: 3/8" dia. min. meeting the requirements of Type A-304 stainless steel.

- I. Expansion Joints: Install expansion joints at locations indicated but not further apart than required to accommodate thermal movement.
- J. Form changes in direction of railing members as follows:
 - 1. By inserting prefabricated elbow fittings.
 - 2. By radius bends of radius indicated.
 - 3. By mitering at elbow bends.
 - 4. By bending.
 - 5. By any method indicated above, applicable to change of direction involved.
- K. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required without deforming exposed surfaces.
- L. Provide toeboards, wall returns, closed ends, brackets, flanges, fittings and sleeves as required for type of installation indicated.
- M. Finish: Aluminum Class I Clear Anodized Finish AA-M12C22A41 complying with AAMA 607.1 color.

2.03 STEEL HANDRAIL SYSTEM (RESERVED)

2.04 FABRICATION

- A. Fit and shop assemble components in largest practical sizes, for delivery to site.
- B. Fabricate components with joints tightly fitted and secured.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- D. Supply components required for anchorage of fabrications. Fabricate components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- F. Accurately form components to suit stairs and landings to each other and to structure.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

- A. Clean steel and concrete surfaces which will be in contact with handrail post assemblies.
- B. Supply neoprene for installation between aluminum flange plate and supporting surface.

3.03 INSTALLATION

- A. Set work accurately in location, alignment and elevation and free from rack.
- B. Provide all returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of the railing and wall is 1/4" or less.
- C. Comply with manufacturer's recommendations for field connections of handrail and railing members.
- D. Anchor posts to metal surfaces with fittings designed for this purpose.
- E. Anchor rail ends to masonry and concrete with round flanges connected to rail ends and fastened to wall with post-installed anchors and bolts.

3.04 ERECTION TOLERANCES

- A. Deviation from plumb, level and alignment shall not exceed 1 in 500.

END OF SECTION 05520

DIVISION 9 - FINISHES
Section 09900 - Painting

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Under this item, the Contractor shall furnish all labor, equipment, and materials required for painting as specified herein. Failure of the specifications to list any surface shall not be reason to leave piping and equipment surfaces unpainted. For surfaces not listed, painting shall be as directed by the Engineer.

1.02 RELATED WORK

- A. Division 5 – Metals
- B. Division 11 – Equipment
- C. Division 15 – Mechanical

1.03 QUALITY ASSURANCE

- A. Prior to any field painting, the Contractor shall require his painting Subcontractor to attend a pre-painting conference, also to be attended by representatives of the Contractor, the Engineer, the Owner, and the paint supplier.

1.04 SUBMITTALS

- A. The Contractor shall submit the type of paint system intended to be used, indicating items to be painted, preparation, paint manufacturer, product designation and dry film thicknesses.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Paint shall be stored on site in accordance with the manufacturer's recommendation. In no case shall paint be allowed to freeze or exceed the shelf life.
- B. All materials shall be delivered in original sealed containers of the manufacturer. Labels shall show the name of manufacturer, type of coating, formulation, color and instructions for application.

PART 2 PRODUCTS

2.01 SHOP PAINTING

- A. Shop painting as referred to herein is defined as the paint coat applied in the shop or plant immediately after the manufacture, fabrication or assembly, and prior to shipment to the site of installation. All machinery, metal, pipe and millwork shall receive at least one shop coat of paint prior to shipment, except as specifically approved by the Engineer.

- B. Shop paint shall be as manufactured by the Tnemec Company, Inc., Carboline, or equal. Shop paint shall be compatible with the finish paint to be used, and the Contractor shall obtain the Engineer's approval of the paint to be used, before ordering the preparation of shop prints. Shop paint shall be indicated on shop prints. Cast-iron pipe not to be buried shall not be tar dipped, but shall receive a shop coat of rust-inhibitive primer. The primer listed shall be a shop coat unless otherwise stated.

2.02 FIELD PAINTING

- A. Field painting defines the paint coat or coats to be applied at the site where the structure is completed after erection or final installation in place, as specified.
- B. Field paint shall be as manufactured by Tnemec Company, Inc., Carboline, or equal. The Contractor shall obtain the Engineer's approval of the paint to be used, and the shop paint and the field paint shall be compatible.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

- A. Prior to the application of shop paint, the metal surfaces shall be cleaned to removed visible rust, mill scale, paint and other foreign matter. Unless otherwise indicated in the Special Provisions, the cleaning shall conform to SSPC-10 (Near White Blast).
- B. No paint shall be applied on a wet or dirty surface. Rusted metal surfaces shall be wire brushed or sandblasted, if necessary, to prepare the surface for painting. If the shop coat has been damaged by the surface preparation, a field primer compatible with the finish paint shall be applied.

3.02 SHOP COATS

- A. Shop coats shall be in accordance with the listing that follows, or as approved by the Engineer, in accordance with the manufacturer's standard practice. After erection, the surfaces shall be touched up where damaged in shipping and erecting with the same type paint used as a shop coat.

3.03 FINISH COATS

- A. After erection or installation, the equipment or materials installed or erected shall be touched up where the paint has been damaged during shipment or erection or installation, with the same type paint used as a shop coat.
- B. Materials or equipment not accessible after erection shall be painted before erection.
- C. Lintels shall be painted prior to installation if not required to be galvanized.

3.04 COATING THICKNESS

- A. The Contractor shall apply the number of coats, and attain the dry-mil thickness as listed. Where the number of coats and dry-mil thickness is not indicated, the paint manufacturer's recommendations shall be followed as to the number of coats and paint thickness for the intended service.
- B. Should the specified dry-mil thickness not be achieved by the number of coats shown, additional coats shall be applied to achieve the required dry-mil thickness. Roller or brush application will require additional costs.

NOTE: The dry-mil thickness is shown separately for each type of paint; i.e., the thickness for finish coats is exclusive of the primer.

NOTE: LIST OF LOCATIONS, SURFACES, AND NUMBER OF COATS, PAINT PRODUCT AND TOTAL DRY-MIL THICKNESSES ARE SHOWN ON THE FOLLOWING PAGES.

3.05 COLOR

- A. Unless colors are indicated in the specifications, color selection shall be by the Owner.
- B. Undercoats shall be tinted slightly to insure coverage of subsequent coats.
- C. It is the intent that the finish coat be gloss or semi-gloss.

3.06 COLD WEATHER

- A. During cold weather (less than 55°F), the Contractor shall comply with the paint manufacturer's recommendations as to the minimum temperature at which paint may be applied, and shall not apply paint below that temperature without the express permission of the Engineer.

3.07 SPECIAL SURFACES

- A. Galvanized surfaces need not be painted except as indicated. Where painting of galvanized surfaces is required, the galvanized surface shall receive SSPC-SP-1 solvent cleaning before application of field paint.
- B. All aluminum surfaces exposed to new concrete or within a concrete pour shall be coated with an unthinned coating of bitumastic paint.
- C. Painting of stainless steel, aluminum, PVC and fiberglass surfaces is not required, unless otherwise noted.

3.08 OVERSPRAY PROTECTION

- A. In areas where surfaces may be damaged by overspray, field application of paint shall be by brush or roller.

3.09 TOUCH-UP PAINT

- A. The Contractor shall provide one gallon of touch-up paint for each color of paint provided.
- B. Galvanized surfaces shall be touched-up with ZRC Cold Galvanizing Compound, or equal.

3.10 PAINTED SURFACES LIST

- A. The following is a list of the kind of paint, number of coats and coverage for major items to receive coatings. The list is for Tnemec paint. Should Carboline paint be used, equivalent materials, number of coats (as determined by the Engineer) shall be used, and the Contractor shall submit a list (comparable to that given for Tnemec paint) to the Engineer for approval. This list does not include all items to be coated, and does not relieve the Contractor from his responsibility to provide coatings on all items as required by the specifications.

PAINT SYSTEMS

System	# of Coats	Total Dry Product	Total Dry Mil Thickness
A	1	66-1211 Epoxoline Primer	2
	3	66-Hi-Build Epoxoline	12
B	1	66-1211 Epoxoline Primer	2
	2	66-Hi-Build Epoxoline	6
	1	71 Endura Shield	1.5
C	1	66-1211-Epoxoline Primer	2
	2	66-Hi-Build Epoxoline	6
	1	71 Endura Shield	1.5
D	1	54-660 Epoxy-Polyamid Masonry Filler	N/A
	2	83 Ceramulon II	8

PAINT LIST

Item	System	Color
Exposed Surfaces of Equipment	B	Slate Gray
Piping – Paint All Piping and Piping Supports	A	See Table Below

Basic colors for piping shall be as follows:

Type of Piping	Color
Gas Lines	Safety Red
Potable Water	Safety Blue
Non-Potable Water	Aqua Sky
Sewage Lines	Slate Gray
Piping Supports	Slate Gray

END OF DOCUMENT 09900

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Under this item the Contractor shall furnish and install all slide gates complete with operators and accessories. The gates shall be of the size and satisfy the head requirements as shown on the gate schedule. The gates shall be furnished with all the necessary accessories for a complete installation.

1.02 RELATED WORK

- A. Division 5 - Metals
- B. Division 16 - Electrical

1.03 QUALITY ASSURANCE

- A. All gates shall be completely assembled at the factory and checked for proper operation prior to delivery. Prior to shipping, the stem covers and pertinent operator components may be removed from the gates but they must be marked and tagged for proper field erection. All slide gates shall be furnished by the same manufacturer.

1.04 REFERENCE TO STANDARDS

- A. AWWA C501.
- B. Aluminum Association-AA-C22-A41.

1.05 SUBMITTAL REQUIREMENTS

- A. The submittal shall contain the operator and gate as a unit.
- B. The slide gate submittal shall include but not be limited to the following:
 - 1. Physical arrangement
 - 2. Overall dimensions
 - 3. Anchoring method and dimensions
 - 4. Weight and shipping units weight
 - 5. Detail dimensions
 - 6. Materials of construction
 - 7. Nameplate data
 - 8. Wiring diagrams and schematic diagrams
 - 9. Mounting details
 - 10. Bill of materials
 - 11. Finish (i.e. primed, finish coated, etc.)
 - 12. Design calculation for gate
 - 13. Computations for sizing the gate operator

1.06 DELIVERY, STORAGE AND HANDLING

- A. Each slide gate will be shipped with sufficient support and bracing to prevent damage. If necessary, temporary cross-bracing shall be installed to keep the slide gates from warping or other damage due to handling during installation.

1.07 WARRANTY

- A. The manufacturer shall guarantee trouble-free operation for a period of one (1) year from the date of final acceptance by the Owner. If the Owner and his Engineer are not completely satisfied with the performance of the products, the manufacturer shall remedy the problem at no cost or refund the purchase cost upon return of the equipment.
- B. The manufacturer shall specifically guarantee the following:
 - 1. Leakage shall be no more than that allowed by the AWWA C-501 Standards during guarantee period.
 - 2. Slide shall be free of sticking (move freely via operator provided), and
 - 3. No spare parts shall be required.
- C. Leakage shall be checked, randomly, and among the gates provided herein, annually, or as often thereafter as is practicable due to operations, by methods stipulated by the owner and/or engineer. Should any unit be found to be not within the leakage rates as guaranteed, the cost of testing that gate shall also be borne by the manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Any of the following.
 - 1. Rodney Hunt
 - 2. Hydro Gate
 - 3. Whipps
 - 4. Waterman Industries

2.02 FRAME

- A. The frame shall consist of extruded 1/4" minimum thickness aluminum (6061-T6) incorporating ultra high molecular weight polymer (UHMW) seat/seals on both faces of the slide. Each seat/seal will be shaped to provide two bearing surfaces and two sealing edges. Neoprene seals shall be attached to the guides. Frame style shall be self contained. The side guides of the frame shall have a minimum weight of 4#/ft. The gate invert shall have a minimum weight of 4#/ft. The frame invert shall contain a removable neoprene seal. Seals attached to the gate slide will not be acceptable. All necessary type 316 stainless steel anchor bolts shall be provided by the gate manufacturer.

2.03 SLIDE

- A. The slide shall be a minimum thickness 1/4" aluminum (6061-T6) plate reinforced with stiffeners as required so that the design head will not deflect more than 1/360 of its width and stress is limited to 7,000 psi. Slide stiffeners shall have a minimum weight of 2.5#/ft.

2.04 STEM

- A. The operating stem shall be of type 316 stainless steel. The stem shall be of a size to safely withstand without buckling or permanent distortion of the stresses induced by normal operating forces. The stem shall have a minimum diameter of 1-1/2" and shall be designed to transmit in compression at least 2.5 times the output of the manual operator with a 80# effort. The threaded portion of the stem shall have machine cut acme threads. A threaded stop collar shall be provided on all stems to limit downward travel of the slide. Clear lexan plastic stem covers shall be provided with indicator strips for field mounting by the installing contractor.

2.05 OPERATORS

- A. The gate will be equipped with a horizontal handwheel (non-g geared) so that the maximum effort to operate the gate does not exceed a 25# pull when the gate is subjected to its maximum operating head. The handwheel shall have a maximum diameter of 15". The operator will have anti-friction bearings above and below the flange of the bronze operating nut. The operator will be enclosed in high strength cast aluminum housing. The operator shall be arranged so that centerline of the handwheel will be between 36" min. and 48" max. from the operating floor.
- B. Electric Gate Operators
 - 1. General:
 - a. All parts of the lift mechanism shall be designed to move the gate disc at a rate of approximately 12 in./min. under the operating head condition.
 - b. The motor operator assembly shall be L120 Series as manufactured by the Limatorque Corporation, SA Series as manufactured by AUMA Actuators, Inc., or equal.

- c. Unit shall be provided with a control station, to be integral to gate operator. The control station shall consist of a “Local/Off/Remote” selector switch that allows “OPEN”, “STOP”, and “CLOSE”, that can be configured for momentary contact control or maintained mode. The gate controls shall also include a potentiometer and signal converter to output a linear 4-20 mA signal proportional to gate position. The 4-20 mA signal represents 0-100% open with 4 mA = 0% and 20 mA = 100%.
- d. The gate operator shall be approved by Factory Mutual for operation in a Class 1, Division 1, Group D environment. The gate manufacturer’s computations for sizing the operators shall be furnished to the Engineer for approval.

2. Motors

- a. The electric motors for all gate operators except as noted below shall have a continuous duty rating, be a 460 A.C., 60 Hertz three phase motor, have sufficient horsepower to operate the unit through the full gate travel in both directions without exceeding the full-load ampere rating, and conform to applicable requirements of NEMA Publication MG1.
- b. All bearings shall be the anti-friction type.
- c. The motor shall be totally enclosed and weatherproof of the induction type with class F insulation and protected by means of thermal switches embedded in the motor windings and provided with moisture protection by use of a winding heater.
- d. All components including the motor, reversing controllers and thermal overload relays, pushbuttons, indicating lights, control transformer, reduction gearing, stem lift nut, bearings, torque switches and limit switches shall be enclosed in a NEMA Type 4X enclosure, and mounted on the gate frame with stainless steel bolts and nuts.
- e. Limit switches shall be by mechanical or electric counter gear. Limit switches must be capable of quick adjustment with mechanical counter gear requiring no more than five (5) turns of the limit switch spindle and electric counter gear requiring no battery backup.
- f. Reduction gearing shall consist of generated helical gears of heat treated steel. Worms shall be hardened alloy steel with threads ground and polished. The worm gear shall be in one piece of chilled nickel bronze, accurately cut. All reduction gearing shall run in a grease lubricant. All gears, the stem lift nuts and other working components shall be carried on heavy-duty ball or roller bearings adequate for all torque and thrust loads imposed by operation of the gate.

- g. The motor-operator shall be of such design as to permit manual operation of the unit in event of power failure or as necessary during servicing. An operating nut or stem extension shall be a part of the electric operator to connect to a portable electric operator for use during power outages. The motor operator shall include a built-in clutch mechanism so that the operating nut will not rotate during motor operation nor shall the motor turn during manual operation. A seized or inoperable motor shall not prevent manual operation. A dial-type indicator shall be located at the top of the motor-operator to show gate position both hand and motor operation. The indicator shall be graduated to show "FULL OPEN" when the bottom of the gate is at the fully open position. The indicator shall be housed in a watertight enclosure.
- h. The operating unit shall include a built-in, lost-motion device which will permit the motor to attain full speed after which a hammer blow shall be imparted to the hoisting mechanism to initiate gate motion in either the opening or closing direction of travel.
- i. The nuts shall be bronze, made in two pieces with accurately machined splines. The two-piece nut shall consist of an outer member, having a flange or flanges on the exterior and splines on the interior, which mates with an inner member having splines on the exterior and threads on the interior. The outer member shall be mounted in the unit housing. The inner member shall be secured to the outer member by either a threaded retainer ring or another suitable arrangement. After the gate has been either completely closed or securely supported in the partially-open position, this inner member shall be capable of being easily removed by disassembling its retaining arrangement and turning the operating nut.
- j. Each motor-operator shall have a side mounted hand wheel. The unit shall be furnished with a lubricant which will allow operation in the temperature range of -40°F to 120°F.

2.06 REMOTE CRANK DRIVE

- A. Remote crank drives shall be provided whenever the TOC (floor) to the top of the yoke exceeds 48". The input shaft of the gear operator shall be coupled and extended to the side of the frame where it shall be supported by means of a pillow block bearing secured to the frame. The pinion extension shall be keyed and equipped with a sprocket and chain. The chain shall be of sufficient length to allow placement of the auxiliary input shaft at approximately 36" above the TOC (floor). The auxiliary input shaft shall be adjustable for proper chain tensioning and shall be supported by a pillow block bearing secured to the frame. The chain shall be covered by a guard designed to restrict access to the chain.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The installation of the gates shall be done in such manner to ensure the gate frames will be true, square, and plumb. One-half inch of grout will be used for this purpose (to be verified with manufacturer). Sufficient temporary internal bracing shall be installed to assure this.

3.02 INSPECTION

- A. Prior to the operation of the slide gates, the equipment installation shall be carefully inspected and checked by a competent and experienced service representative of the manufacturer. The manufacturer's representative shall make the necessary adjustments, approve the installation and instruct plant operating personnel in the operation of the equipment. Notice of such approval shall be furnished to the Engineer in writing.

3.03 FINISHES

- A. All aluminum components shall be anodized in conformance with Aluminum Association Specification AA-C22-A41. The anodizing shall be 0.7 mils thick with a nickel acetate sealer.

3.04 TESTING

- A. The Contractor shall test the gates installed on this project. The gates shall have water placed to the high water level as shown on the gate schedule. The Contractor shall supply whatever water may be necessary. The means to isolate the chamber for testing shall also be the contractor's responsibility, as well as providing the necessary pumps, hoses and appurtenances to complete the test. The leakage test shall be performed in accordance with AWWA C-501, Section 6 and the leakage rate shall not exceed ten times the amount allowed by AWWA C-501, Section 6. The Contractor's testing procedures shall be submitted to the Engineer for approval and the testing shall be coordinated with the Engineer and the Owner.

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SLIDE GATE SCHEDULE

Location	Number Req'd	Gate Size		Operator Type	Mounting Type	Invert	Head In Feet		Top of Concrete
		Height	Width				Seating	Unseating	
Diversion Structure Clean Water Outfall	1	48"	48"	Electrical	Surface	693.85	10	10	704.20
Diversion Structure Contaminated Outfall to Pond	1	36"	36"	Electrical	Surface	694.85	10	10	704.20

Note: Provide remote crank drive when TOC to top of yoke exceeds 48".

END OF SECTION 11285

DIVISION 11 - EQUIPMENT
Section 11310 - Submersible Pumps

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Under this item, the Contractor shall furnish and install the submersible pumps with appurtenances as specified.
- B. Installation/Removal Assembly.
- C. Anchors.

1.02 RELATED WORK

- A. Section 09900 - Painting.
- B. Section 15260 - Plant Pipe and Pipe Fittings.
- C. Section 15265 - Plant Piping Installation.
- D. Division 16 - Electrical.

1.03 QUALITY ASSURANCE

- A. The pump manufacturer shall perform the following inspections and tests on the pumps before shipment from the factory.
 - 1. Impeller, motor rating and electrical connections shall first be checked for compliance to the customer's purchase order.
 - 2. A motor and cable insulation test for moisture content or insulation defects.
 - 3. Prior to submergence, the pump shall be run dry to establish correct rotation and mechanical integrity.
 - 4. The pump shall be run for 30 minutes submerged, a minimum of 6 feet under water.
 - 5. After operational test No. 4, the insulation test (No. 2) is to be performed again.

A written report stating the foregoing has been done shall be supplied with each pump at the time of shipment.

1.04 SUBMITTAL REQUIREMENTS

- A. Submit under the provisions of these Specifications.

- B. The submittals for the pumps and accessories shall include but not be limited to the following:
1. Equipment Layout (plan and elevation)
 2. Overall Dimensions
 3. Anchor Bolt or Mounting Hole Dimensions
 4. Weight Total and Weights of Shipping Units
 5. Detail Dimensions
 6. Materials of Construction
 7. Capacity
 8. Performance Curves
 9. Nameplate Data
 10. Wiring Diagrams and Schematics Diagrams
 11. Interconnection Diagram (Electrical)
 12. Mounting Details
 13. Bill of Materials
 14. Ambient Conditions Necessary for Efficient Operation
 15. Bearing life calculations, certified, which verify 100,000 hour L-10 life at any point on the useable pump curve at full product speed.
 16. Certification of motor design ambient and full load temperature rise as well as specified service factor and additional 10% VFD safety factor.
 17. Installation list showing the locations of at least 50 pumps of 300 horsepower or greater in service in the United States.

1.05 WARRANTY

- A. The manufacturer shall warrant the units being supplied to the Owner against defects in workmanship and materials for a period of one (1) year from the date of acceptance by the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Base Manufacturer: Information associated with the equipment from the manufacturer named below was used as the basis for the design as specified herein and shown on the drawings.
1. Flygt – N Series Submersible Pumps
- B. Alternate Equipment Manufacturer(s): Equipment from the following manufacturers that meets the intent of the specifications contained in this section shall be considered acceptable. However, the Contractor shall be solely responsible for and pay any and all additional costs associated with changes in structures, piping, buildings, mechanical, electrical, controls, accessories, etc. – including costs for design changes – as required to provide a complete and operational system to accommodate the equipment.
1. “Or Equal”

2.02 SUBMERSIBLE PUMPS

A. General Design Criteria

The design basis for each pump is given in the Schedule at the end of this Section.

1. All submersible pumps shall be by the same manufacturer.
2. The pumps shall be capable of handling raw sewage and shall be capable of passing 3" spherical solids.
3. The pump unit shall automatically and firmly connect to the discharge piping when lowered into place on its mating discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection, permanently installed in the wet well. The pump shall be easily removable for inspection or service, requiring no bolts, nuts or other fastenings to be disconnected. There shall be no need for personnel to enter the wet well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. **Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable.**
4. Each pump shall have a fixed position stainless steel lifting bail for pump removal. The lifting bail shall be at the center of gravity of the pump. Eye bolts connected by a stainless steel cable shall not be considered equal to a lifting bail. The working load of the lifting system shall be 50% greater than the pump unit weight.
5. All major parts, such as the stator casing, oil casing, sliding bracket, volute and impeller shall be of gray cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All surfaces coming into contact with sewage shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish, a coating resistant to sewage.
6. All exposed bolts and nuts shall be of stainless steel.
7. The pumps shall be fully compatible with handling of glycol-containing fluids.

B. Impeller

The impeller shall be of gray cast iron, ASTM A-48 Class 35B, dynamically balanced, semi-open, multi-vane, back swept, screw-shaped, non-clog design. The impeller leading edges shall be mechanically self-cleaned automatically upon each rotation as they pass across a spiral groove located on the volute suction. The screw-shaped leading edges of the impeller shall be hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in wastewater. The screw shape of the impeller inlet shall provide an inducing effect for the handling of up to 5% sludge and rag-laden wastewater. The impeller to volute clearance shall be readily adjustable by the means of a single trim screw. The impeller shall be locked to the shaft, held by an impeller bolt and shall be coated

with alkyd resin primer.

C. Volute/Suction Cover

The pump volute shall be a single piece gray cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have integral spiral-shaped, sharp-edged groove(s) that is cast into the suction cover. The spiral groove(s) shall provide the sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The internal volute bottom shall provide effective sealing between the multi-vane semi-open impeller and the volute.

D. Mechanical Seals

Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system consisting of two seal sets, each having an independent spring. The lower primary seal, located between the pump and seal chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide ring. The upper secondary seal, located between the seal chamber and the seal inspection chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide seal ring. All seal rings shall be individual solid sintered rings. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Mounting of the lower seal on the impeller hub is not acceptable. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces are not acceptable. The seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance.

The area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

A separate seal leakage chamber shall be provided so that any leakage that may occur past the upper, secondary mechanical seal will be captured prior to entry into the motor stator housing. Such seal leakage shall not contaminate the motor lower bearing. The leakage chamber shall be equipped with a float type switch that will signal if the chamber should reach 50% capacity.

E. Lubricant Chamber

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal lubricant chamber shall have one drain and one inspection plug that are accessible from the exterior of the motor unit. The seal system shall not rely upon the pumped media for lubrication. Seal lubricant shall be FDA approved and non-toxic.

F. Bearings

The integral pump/motor shaft shall rotate on two (2) bearings. The motor bearings shall be sealed and permanently grease lubricated with high temperature grease. The upper motor bearing shall be a two row angular contact ball bearing. The lower bearing shall be a two row angular contact ball bearing to handle the thrust and radial forces. The minimum L₁₀ bearing life shall be 50,000 hours at any usable portion of the pump curve.

No other motion of the pump unit, such as tilting or rotating, shall be required. Sealing of the discharge interface by means of a diaphragm, O-ring or other devices will not be considered acceptable or equal to a metal to metal contact of the pump discharge flange and mating discharge connection specified and required. No portion of the pump unit shall bear directly on the floor of the wet well. There shall be no more than one 90° bend allowed between the volute discharge flange and station piping.

G. Pump Motor

Each submersible pump motor shall be 460 Volt / 3 phase / 60 Hz, 25 HP 1750 RPM. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of pins, bolts, screws or other fastening devices used to locate or hold the stator and that penetrate the stator housing are not acceptable. The motor shall be designed for continuous duty while handling pumped media of up to 104°F. The motor shall be capable of no less than 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of aluminum. Three thermal switches shall be embedded in the stator end coils, one per phase winding, to monitor the stator temperature. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the motor control panel.

The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.

The motor service factor (combined effect of voltage, frequency and specific gravity) shall be 1.15. The motor shall have a voltage tolerance of +/- 10%. The motor shall be designed for continuous operation in up to a 40°C (104°F) ambient and shall have a NEMA Class B maximum operating temperature rise of 80° C (176°F). A motor performance chart shall be provided upon request exhibiting curves for motor torque, current, power factor, input/output kW and efficiency.

The chart shall also include data on motor starting and no-load characteristics.

Motor horsepower shall be sufficient so that the pump is non-overloading throughout its entire performance curve, from shut-off to run-out. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

Additionally, the motor shall be sized sufficiently such that the curve at full speed shall be at least 10% less than the nameplate horsepower. Motor shall in addition be large enough to meet all of these specified temperature limits and safety factors when operating with an impeller large enough to produce 10% more head at the design conditions than is currently specified.

Pump Shaft: The pump and motor shaft shall be a single piece unit. The pump shaft is an extension of the motor shaft. Shafts using mechanical couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T. Shaft sleeves will not be acceptable.

H. Pump Cable

The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of dual cylindrical elastomer grommets, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter. The grommets shall be compressed by the cable entry unit, thus providing a strain relief function. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be sealed from each other, which shall isolate the stator housing from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered equal.

Pump motor cable installed shall be suitable for submersible pump applications and this shall be indicated by a code or legend permanently embossed on the cable. The power cable shall be sized according to NEC and ICEA standards and also meet with P-MSHA Approval for pump motors, and shall be of adequate size to allow motor voltage conversion without replacing the cable. A minimum of 50 feet of cable shall be supplied.

I. Seals

Sealing design shall incorporate **metal-to-metal contact** between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

Tolerances of all parts shall be such that allows replacement of any part without additional machining required to insure sealing as described above.

J. Cooling System

The pumps shall be provided with an adequately designed cooling system, consisting of a cooling jacket which encircles the stator housing, providing for dissipation of motor heat regardless of the type of pump installation, where required in the event supplemental cooling is required other than the surrounding environment or pumped media. Cooling media channels and ports shall be non-clogging by virtue of their dimensions. All pumps shall be capable of operating continuously with the motor operating dry. The cooling system shall provide for continuous pump operation in liquid or ambient temperatures of up to 104 degrees F (40 degrees C). Operational restrictions at temperatures below 104 degrees F are not acceptable. Fans, blowers, or auxiliary cooling systems that are mounted external to the pump motor are not acceptable.

K. Thermal Sensors

Each pump motor stator shall incorporate three thermal switches, one per stator phase winding and be connected in series, to monitor the temperature of the motor. Should the thermal switches open, the motor shall stop and activate an alarm.

The thermal switches shall be connected to a Mini CAS control and status monitoring unit. The Mini CAS unit shall be designed to be mounted in the pump control panel.

L. Leakage Sensor

The float leakage sensor shall be a float switch which when activated shall stop the motor and send an alarm. A float switch shall be installed in the seal leakage chamber and will activate if leakage into the chamber reaches 50% chamber capacity, signaling the need to schedule an inspection. The water tight junction chamber at the cable entry shall also be fitted with a float leakage sensor.

The float switch shall be connected to a Mini CAS control and status monitoring unit. The Mini CAS unit shall be designed to be mounted in the pump control panel.

M. Pump Accessories

The submersible pump locations shall be furnished with the following accessories, by the pump manufacturer.

1. Cable holders. (also see paragraph H - Pump Cable).
2. Nameplate. Each unit to be complete with a stainless steel nameplate securely attached to pump itemizing pump data including model number, serial number, impeller diameter and part number.

2.03 INSTALLATION / REMOVAL ASSEMBLY

A. Sliding Guide Bracket

A sliding guide bracket shall be an integral part of the pump unit. The volute casing shall have a machined discharge flange to automatically and firmly connect with the cast iron discharge connection, which when bolted to the floor of the sump and discharge line, will receive the pump discharge connecting flange without the need of adjustment, fasteners, clamps, O rings, packing or similar devices.

B. Guide Bars

Installation of the pump unit to the discharge connection shall be the result of a simple linear downward motion of the pump guided by no less than two hot dipped galvanized steel guide bars. The guide bars shall be of the size recommended by the pump manufacturer and shall be made from Schedule 40 hot dipped galvanized steel pipe.

C. Guide Bar Brackets

Intermediate guide bar brackets - sized as required by the pump manufacturer, spaced as recommended by the manufacturer. Brackets shall be stainless steel.

Upper Guide Bar Brackets - sized as required by the pump manufacturer. Brackets shall be stainless steel.

D. Lifting Device

The pump shall be provided with a lifting bail which permits the pump to be lifted with a single hook so that it hangs in true vertical position.

E. Grip-eye System

Provide a grip-eye system such that a hoist cable can be lowered along a guideline, hook the pump lifting chain at the pump and then raise the pump. System shall include guideline equal in length to the depth of the pump wet well, a short length of high tensile strength galvanized chain and a forged "grip-eye" of wrought alloy steel.

2.04 ANCHOR BOLTS

- A. Furnish and install Type 304 stainless steel epoxy anchor bolts of the size and number recommended by the pump manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that anchor bolts are correct size and positioned properly.

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. Install submersible pumps, installation/removal assembly, control equipment and accessories in accordance with manufacturer's instructions and as shown on the drawings.
- B. Install interconnecting electrical wiring, conduit, etc. between submersible pumps and control equipment so that when power and control wiring is brought to the control equipment, the submersible pump system will be a complete operational system.

3.04 MANUFACTURER'S SERVICES

- A. The Contractor shall include with his bid the services of the equipment manufacturer's field service technician for a period of two (2) trips and two (2) 8-hour days at the site. This service shall be for the purpose of check-out, initial start-up, certification, and instruction of plant personnel. A written report covering the technician's findings and installation certification shall be submitted to the Engineer covering all inspections and outlining in detail any deficiencies noted.

3.05 TESTING

- A. Before final acceptance of the pumps specified herein, the Contractor shall submit five (5) copies of certified and properly identified performance curves which shall reflect the operating characteristics of each pump model and impeller combination being supplied. The curves shall indicate head, capacity, horsepower, efficiency and input KW.

Prior to plant operation, all equipment shall be inspected for proper alignment, quiet operation, proper connection and satisfactory performance by means of a functional test.

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3.05 SCHEDULES

A. Submersible pump schedule.

Full Speed
Design Duty Point Conditions

Service	No. of Pumps	Total Flow (GPM)	Design Flow (GPM)	Operating Head Range (FT)	Duty Point TDH (FT)	Static Head (Ft.)	Minimum Motor Size (HP)
Sanitary Lift Station Pumps	2	1,546	1,500	N/A	71.7 ⁽¹⁾	25.8	25 ⁽²⁾

- (1) Pump/motor shall be capable of 10% additional TDH at the design flow rate with merely an impeller change while still meeting the specified motor temperatures and safety factors.
- (2) Motor shall be non-overloading at full speed over the specified operating head range when a 1.15 service factor is provided for at the specified ambient temperature (40° C) and maximum 80° C temperature rise.

END OF SECTION 11310

DIVISION 13 – SPECIAL CONSTRUCTION
Section 13423 – Magnetic Flowmeters

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. The Contractor shall furnish and install flowmeters as described herein and as shown on the plans.

1.02 RELATED WORK

- A. Section 09900 - Painting.
- B. Section 15260 - Plant Pipe and Pipe Fittings.
- C. Section 15265 - Plant Piping Installation.

1.03 QUALITY ASSURANCE

- A. Flowmeter manufacturers shall have a minimum of five years experience in the manufacture and operation of flowmeters of the type specified herein.

1.04 SUBMITTALS

- A. Submittals shall meet the requirements of these Specifications. Submittals shall also include a calibration report for each flowmeter.

1.05 WARRANTY AND SERVICES

- A. The Contractor shall provide warranty for all items under this section for one year from the date of acceptance by the Owner. During that one year, the Contractor shall at his expense replace any part or parts which malfunction or corrode due to defective manufacture or installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Base Bid
 - 1. All magnetic flowmeters to be utilized on this project shall be furnished by a single manufacturer and shall be one of the following:
 - a. ABB Magmaster/MFE/F
 - b. Krohne Aquaflux 4080AQF Flowtube & IFC090 Converter

B. Alternates

1. None

2.02 MAGNETIC FLOWTUBE FLOWMETERS

A. Flow Tube

1. The flowmeter shall be of the electromagnetic type, utilizing pulsed DC excitation with microprocessor based converter/transmitter. The flowmeter shall measure flow signals throughout the cross-sectional area. Single or multi-point measurement devices are not acceptable.
2. Unless otherwise specified, all magmeter applications shall utilize full-pipe measurement and will always flow full.
3. The flowmeter accuracy shall be better than $\pm 0.5\%$ of measured value or better in both forward and reverse flows.
4. As a minimum, the magmeter shall be capable of operating at specified accuracy with flow velocity between 3 ft/sec and 30 ft/sec.
5. The repeatability shall be $\pm 0.1\%$ of reading or better.
6. Magnetic flowmeters shall operate with process streams having conductivity of $20 \mu\text{S/cm}$ or greater.
7. The meter shall offer a stable zero and shall not require routine zeroing. The meter shall automatically indicate zero under empty sensor conditions.
8. Once installed in process pipeline, the magmeter and converter/transmitter shall be capable of digital set-up and commissioning in order to verify the integrity of sensor, cabling and transmitter. The testing technique shall provide verification of the complete flow system, i.e., sensor and transmitter in-situ, without removal of, or access to, the sensor. A verification certificate shall be provided. Upon request, references indicating successful installations with over two years operation shall be provided.
9. The flowmeter shall be designed and manufactured under ISO 9001 series of quality standards.
10. The wetted materials shall be compatible with the process stream listed in the table provided at the end of this section.
11. Unless otherwise specified, the liner material shall be either neoprene or hard-rubber. Liner material for potable water shall be third-party certified and internationally recognized by a body such as WRC, AWWA or equal.

12. Magmeter electrodes may be stainless-steel, Hastelloy C, or titanium.
13. The magmeter body (flow-tube) shall be rated to NEMA 6P (IP68) and suitable for indefinite (continuous) submergence in water to a depth of 30 feet. The magmeter body shall also be suitable for installation in underground pipes without the need for a metering chamber, vault or pit (i.e., it shall be capable of direct burial). The manufacturer shall, on request, provide evidence of satisfactory operation of such sensors for a minimum period of 5 years in buried installations.
14. The metering tube shall be constructed of 304 stainless steel with 150# ANSI carbon steel flanges.
15. Magmeter Bodies shall be suitable for installation in a Class I, Division II, Group D Hazardous Location.
16. All conduit entrances shall be either ½" or ¾" FNPT.
17. All magmeters shall be furnished with either grounding electrodes or a pair of compatible ground rings. Where ground rings are furnished, install per all manufacturer's requirements. All grounding and bonding per manufacturers requirements is considered incidental to this section.

B. Remote Flow Converter

1. Converter shall provide separate isolated outputs for analog transmitter (4-20mA) and pulse outputs (volt free). The working flow range shall be fully configurable in the field by the end user.
2. Instrument power shall be 120 VAC, 60 Hz.
3. Magmeter Converter/Transmitter housing shall be rated NEMA 4X (IP65), non-hazardous.
4. All conduit entrances shall be either ½" or ¾" FNPT.
5. The input impedance shall be 10^{15} Ohms or greater so that the electrode fouling does not affect signal and electrode seal integrity.
6. The converter/transmitter display shall be capable of indicating flowrate and totalization simultaneously in user selectable engineering units. The totalizer shall be 9 digits minimum. Display shall also be capable of indicating alarm status, percentage of span, and velocity.
7. The transmitter shall be configurable by use of a keypad located on the front face of the transmitter.

8. Magmeter signal cable between magmeter body and remotely mounted Flow Converter/Totalizer shall be furnished by the manufacturer in sufficient length to permit field installation without splicing. Cables installed without meeting this requirement will be rejected and shall be replaced at Contractor's expense.

PART 3 EXECUTION

- A. Install flowmeters as shown on drawings and per manufacturer's recommendations.
- B. Provide reducers as needed upstream and downstream where indicated on drawings or as required to accommodate pipe and magmeter dimensions. Cost shall be considered incidental to this item and will not be paid for separately.
- C. All magnetic flowmeters shall be factory tested and calibrated for respective flow ranges. A calibration report shall be submitted with the flowmeters and recorders submittals.
- D. Provide manufacturers certified start-up technician for two (2) trips at eight (8) hours each for start-up, calibration and commissioning equipment. Provide certified test reports to Engineer after calibration.

FLOWMETER SCHEDULE						
Location & Tag #	Application	# Units Req'd	Type	Throat Size	Flow Range	
					Minimum	Maximum
Sanitary Lift Station Meter Vault	Sewage Flow	1	Magmeter	6"	0	1,546

END OF SECTION 13423

DIVISION 15 - MECHANICAL
Section 15260 – Plant Pipes and Fittings

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe and pipe fittings.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION (RESERVED)

1.03 RELATED SECTIONS

- A. Section 09900 - Painting.
- B. Section 15265 - Piping Installation.
- C. Section 15270 - Valves

1.04 REFERENCE TO STANDARDS

- A. ASTM - American Society of Testing Materials.
- B. AWWA - American Waterworks Association.
- C. ANSI - American National Standards Institute.

1.05 SYSTEM DESCRIPTION (RESERVED)

1.06 SUBMITTALS

- A. Submit under the provisions of Special Condition - Section 01300.
- B. Shop Drawings:

At least 60 days prior to installation of piping systems covered in these specifications, the Contractor is required to submit to the Engineer complete drawings of each piping system to be installed showing locations, dimensions, and details of all runs of piping, including piping sizes, pipe materials, fittings, valves, hangers, supports, and other equipment. Detailed drawings of any proposed departure due to actual field conditions or other causes shall be included with the foregoing submittal. The manufacturer's catalog description of all valves, hangers, supports, equipment, and other items shall also be submitted for review to show conformance with the requirements of these specifications and the contract drawings. The piping shop drawings shall be new drawings prepared by the Contractor, not a mark-up of contract drawings, and the shop drawings shall have a bill of material on each drawing defining all items mentioned above. All catalog and descriptive data shall note where the specific item is to be installed and a cross reference made on the piping shop drawings.

1.07 QUALIFICATIONS

- A. Manufacturer shall certify to a minimum 3 years experience specializing in manufacturing of products specified herein.

1.08 QUALITY ASSURANCE

- A. The Contractor shall establish and maintain quality control of all equipment and construction operations involved under this item. To assure compliance with contract requirements, the contractor shall maintain records of his quality control for all items listed below.

1. Check for damage to and defects in materials.
2. Check for proper storage of materials and provide a systematic listing of these items and their location.
3. Check to see that shop drawings on all piping systems have been submitted and are reviewed.
4. Check to see that all piping materials conform to reviewed shop drawings.
5. Review requirements of plans and specifications and check layouts.

A copy of these records shall be kept at the jobsite and shall be available at all times for the Engineer's review.

- B. All manufactured items shall be standard commercial products of reputable manufacturers. Where materials are shown on the drawings or listed but not specifically covered by a standard or specification, the Contractor shall furnish best commercial grades of material or articles subject to the review of the Engineer. When two or more articles of the same material or equipment are required, similar articles of the same size shall be products of a single manufacturer.
- C. The Contractor shall furnish the Engineer with sufficient copies of the manufacturer's sworn certificates and test results from a reputable testing laboratory showing the results of tests made on all pipe delivered to the project in accordance with the ASTM, AWWA, or ANSI Specifications for the various types of pipe to be furnished. All expenses incidental to the pipe testing shall be considered as included in the prices bid for pipe furnished and installed, and no additional payment will be allowed therefore.
- D. The Contractor shall furnish the Engineer with lists, in duplicate, of all pieces of pipe and fittings in each shipment received, and these lists shall give the serial or mark number, weight, class, size and description of each item received at the jobsite.

1.09 REGULATORY REQUIREMENTS (RESERVED)

1.10 COORDINATION (RESERVED)

1.11 MAINTENANCE SERVICE (WARRANTY)

- A. The Contractor shall warrant the equipment and materials to be free of material or workmanship defects for a period of one year from the date of acceptance by the Owner.

1.12 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. U.S. - DIP.
- B. American - DIP.
- C. Mueller Co. - Cast iron cut-in or tapping sleeve.
- D. Indurall - DIP linings for high temperature applications.
- E. Tnemec - Painting.
- F. Tyler Pipe Co. - Cast iron soil pipe (CISP).
- G. Fernco - Couplings.
- H. Johns-Manville - PVC.
- I. Certain Teed - PVC.
- J. Chemtrol - PVC.
- K. Cabot - PVC.

2.02 DUCTILE IRON PIPE

A. Buried

Size in.	Pressure Class psi	Nominal Thickness in.	Type 4 Trench Maximum Cover – ft.	Size in.	Pressure Class psi	Nominal Thickness in.	Type 4 Trench Maximum Cover – ft.
3	350	0.25	100	20	250	0.33	22
4	350	0.25	85		300	0.36	26
6	350	0.25	47		350	0.38	28
8	350	0.25	34	24	200	0.33	17
10	350	0.26	28		250	0.37	20
12	350	0.28	28		300	0.40	24
14	250	0.28	23	30	350	0.43	28
	300	0.30	26		150	0.34	14
	350	0.31	27		200	0.38	16
16	350	0.30	24		250	0.42	19
	300	0.32	26		300	0.45	21
	350	0.34	28		350	0.49	25
18	250	0.31	22	36	150	0.38	14
	300	0.34	26		200	0.42	15
	350	0.36	28		250	0.47	18
					300	0.51	20
	42				350	0.56	24
					150	0.41	13
					200	0.47	15
					250	0.52	17
				300	0.57	20	
				350	0.63	23	

1. Joints

- a. Push-On: ANSI A21.11 or AWWA C111, American Fastite Joint or U.S. Pipe Tyton Joint, gaskets and lubricant included for 20" diameter and larger pipe.
- b. Mechanical Joint: ANSI A21.11 or AWWA C111 for 16" diameter and smaller.
- c. Bolts, nuts, and glands shall be Alloy Steel (Corten or US alloy type) and be cathodic to ductile iron and cast iron.

The gaskets for mechanical joints in the activated sludge storage tank aeration piping systems shall be an EPDM material suitable for service in applications conveying 225°F air. All other gaskets shall be plain rubber styrene-butadiene, unless a particular application requires otherwise.

- d. The Contractor shall have the option of using mechanical joints with retainer glands or restrained joints for all 16" diameter and smaller pipe except for air piping.

2. Fittings

- a. Mechanical Joints: Shall conform to ANSI A21.11 (AWWA C111). Mechanical joint fittings shall be standard body with ductile iron retainer glands unless noted otherwise. Shall be of class or pressure rating not less than that of connecting pipe.
- b. Push-On Joints: Shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 American Fastite Joint or U.S. Pipe Tyton Joint, gaskets and lubricant included for 20" diameter and larger pipe.
- c. Restrained Joints: Shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 American Flex-Ring or U.S. Pipe TR Flex for 16" diameter and smaller pipe, except air piping.
- d. All fittings shall be of the class or pressure rating not less than that of the connecting pipe.
- e. The Contractor shall have the option of using mechanical joints with retainer glands or restrained joints for all 16 diameter and smaller pipe except for air piping.

3. Linings

- a. Cement Linings: ANSI A21.4 or AWWA C104 unless otherwise indicated, all ductile iron pipe and fittings shall be cement lined and coated within an asphalt seal coat. Pipe used for air service shall not be cement-lined.

4. Coatings: Tar coated in accordance with ANSI A21.51.

B. Non-Buried: ANSI A21.51, pressure class 250.

1. Joints

- a. Flanged: ANSI A21.15 or AWWA C115, Class 125 drilled and faced per ANSI B16.1.

Required nuts, bolts, and studs shall be cadmium plated. Gaskets shall be plain rubber styrene-butadiene. Gaskets for flanged joints in the aeration piping systems shall be an EPDM material suitable for service in 225°F air applications. Uni-flanges shall be permitted when specifically shown on the drawings or approved by the Engineer.

2. Fittings

ANSI A21.10 (AWWA C110) All fittings shall be standard body of class or pressure rating not less than that of connecting pipe. Flange fittings requiring bases shall have the base flange machined and drilled in accordance with ANSI A21.10.

3. Linings

a. Cement Linings: ANSI A21.4 or AWWA C104 unless otherwise indicated, all ductile iron pipe and fittings shall be cement lined and coated within an asphalt seal coat. Pipe used for air service shall not be cement lined.

4. Coatings

Contractors and pipe suppliers shall note that ductile iron pipe and fittings which are to be exposed (not buried) shall not be tar coated, but shall receive a coat of rust inhibitive primer (66-1211 Epoxoline Primer) by Tnemec Company, or equal. Contractor shall notify the Engineer and suppliers of the paint system he proposes to use. Primers for ductile iron pipe shall be compatible with that paint. In the event that piping, which is to be for exposed use, is shipped to the job with a tar coat, the contractor shall remove the tar coat by sandblasting and apply prime coat with Tnemec 66-1211 Epoxoline Primer, or equal, at his own expense.

The exposed piping shall be finish coated in accordance with Section 09900 - Painting.

2.03 PVC SANITARY SEWER PIPE

A. SDR 26 PVC Sewer Pipe

PVC gravity sewer pipe shall be SDR 26 solid wall PVC sewer pipe. Pipe up to 15" in diameter shall conform to ASTM Specification D-2241 (latest revision). Joints shall be the rubber-gasketed slip-on type meeting ASTM D-3139. Either Class I, II or III granular cradle shall be permitted for embedment. Delivery, storage, handling and installation of pipe shall be in strict accordance with the manufacturer's instructions. Pipe bedding and compaction shall be in accordance with manufacturer requirements in order to provide warranty for the pipe.

B. AWWA C900 and C905, D.R. 18 Forcemain

1. Joints: Push-on type with rubber gaskets.

PVC pipe shall have rubber gasketed joints, shall be Dimension Ratio 18 (Pressure Class 150) and shall conform to AWWA Specification C900 and C905 (latest revision). PVC pipe shall have outside diameter equal to ductile iron pipe. Rubber gaskets shall meet ASTM Specification F477.

For all PVC pipe, additives and fillers, including but not limited to stabilizers, antioxidants, lubricants, colorants, etc. shall not exceed ten (10) parts by weight per one hundred (100) parts of the resin in the compound. Manufacturers will be required to certify that their pipe compound meets this requirement as well as cell classification.

All pipes shall be furnished with a painted ring or other acceptable marking suitable for determining whether or not the pipe has been properly inserted into the coupling. Each pipe shall be clearly marked with the nominal diameter, manufacturer's name, class pressure rating and identification code.

All buried PVC forcemains shall be installed with a parallel 12 gauge copper wire alongside the pipe. The wire shall be electrically continuous. Only waterproof splices shall be permitted such as 3M, or equal. Wire shall terminate at manholes, valve boxes, air release valves or other structures along the forcemain.

2. Fittings: ANSI A21.11 (AWWA C111), ductile iron standard body mechanical joint type.

2.04 STEEL PIPE AND FITTINGS (RESERVED)

2.05 CONCRETE PIPE (RESERVED)

2.06 WALL SLEEVES

- A. The wall sleeves and wall pipes shown on the drawings for metallic piping 3" and larger shall be made of either cast iron or ductile iron. The wall sleeves and wall pipes shall have a water collar and the length shall be as required for wall thickness or as shown on the drawings.
- B. The wall sleeves and wall pipes shall have either mechanical joints or flanged joints as shown on the drawings and furnished complete with studs, glands and gaskets. Where ends are flush with a concrete wall, ends shall be tapped for studs. Refer to ductile iron pipe for gasket requirements.
- C. Contractor shall be required to furnish wall sleeves for all wall or floor penetrations in which the pipe passes from a wet well or tank of water into a dry pit area, or from a backfilled exterior into a wet well, tank of water or dry room area, unless shown otherwise on the drawings.

2.07 LINK SEALS

- A. The link seals used on this project shall be rated for corrosive service. The link seals shall be suitable for use over a range in temperature between -40°F and 250°F. The pressure plates shall be glass reinforced nylon plastic. The bolts and nuts shall be 18-8 stainless steel (type 304). The seating element shall consist of EPDM rubber. The link seals shall be Thunderline Corporation, LS model, or equal.

2.08 CUT-IN, TAPPING SLEEVE AND SPLIT SLEEVES (RESERVED)

2.09 COPPER PIPING AND TUBING (RESERVED)

2.10 FLANGE ADAPTERS

- A. Flange adapters shall be installed at locations shown on the drawings or at locations approved in writing by the Engineer. The flange and adapter shall be made from ductile iron ASTM A536 grade 65-45-12 and drilled in accordance with ANSI B16.1 and have a working pressure of 250 psi for 2 inch to 12 inch and 150 psi for 14 inch to 24 inch. The flange adapter shall be furnished with EPDM gaskets and have set screws for gripping the perimeter of plain end pipe. The flange adapter shall be a Uni-Flange Series 400, or equal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that excavations are at the required grade, dry and not over-excavated.

3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.

3.03 INSTALLATION

- A. See Section 15265 - PIPING INSTALLATION.

END OF SECTION 15260

DIVISION 15 – MECHANICAL
Section 15265 - Plant Piping Installation

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. The work included in this section is the installation of the various piping systems shown on the plans. Pipe materials and pipe fittings are specified elsewhere.

1.02 RELATED WORK

- A. Section 15260 - Plant Pipe and Pipe Fittings
- B. Section 15270 - Valves

1.03 QUALITY ASSURANCE

- A. Proper and suitable tools and appliances for the safe and convenient handling and placing of the pipes, specials and valves shall be used. All pieces shall be carefully examined for defects and no piece shall be laid which is known to be defective. If any defective piece should be discovered after having been laid, it shall be removed and replaced with a sound piece, in a satisfactory manner, by the Contractor at his own expense. The pipes, specials, and valves shall be thoroughly cleaned before they are placed, shall be kept clean until they are accepted in the completed work, and when laid shall conform accurately to the lines and elevations as specified.
- B. The drawings show the general arrangement for both underground and exposed piping systems. Whenever the Contractor deems it necessary to deviate from the arrangements shown, he shall submit to the Engineer in writing a request for the deviation, along with drawings showing the proposed new arrangement. Deviation shall not be made until approval of new arrangements is obtained. Wherever piping arrangements are shown or required to be modified to accommodate the equipment approved for installation, the Contractor shall prepare and submit for approval detailed shop drawings of the new arrangement. Only new and unused materials shall be installed in the work specified herein.
- C. The contract drawings are not intended to show every fitting, offset, or similar item. Piping systems shall include all unions, fittings, flanges, anchors, valves, gaskets, nipples, strainers, hangers, vents, gauges, or other equipment necessary for the proper installation of the various systems, but shall include not less than that shown in the contract drawings. Piping shall be arranged and installed approximately as indicated, straight, plumb, and as direct as possible, and in such manner that right angles or parallel lines are formed with building walls. All pipes shall be cut accurately to measurements established at the building and shall be installed without springing or forcing. All changes in direction of piping shall be made with fittings. Reduction in sizes of pipes shall be made with reducing fittings. Bushings will not be permitted unless specifically detailed on the drawings.

1.04 REFERENCES TO IDOT STANDARDS

- A. IDOT Standard Specifications (latest revision).
- B. ASTM D698 Standard Proctor Density Test.

1.05 SUBMITTALS

A. Piping Systems

At least 60 days prior to installation of piping systems covered in these specifications, the Contractor is required to submit to the Engineer complete drawings of each piping system to be installed showing locations, dimensions, and details of all runs of piping, including piping sizes, pipe materials, fittings, valves, hangers, supports, and other equipment. Detailed drawings of any proposed departure due to actual field conditions or other causes shall be included with the foregoing submittal. The manufacturer's catalog description of all valves, hangers, supports, equipment, and other items shall also be submitted for approval to show conformance with the requirements of these specifications and the contract drawings. The piping shop drawings shall be new drawings prepared by the Contractor, not a mark-up of contract drawings, and the shop drawings shall have a bill of material on each drawing defining all items mentioned above. All catalog and descriptive data shall note where the specific item is to be installed and a cross reference made on the piping shop drawings.

- B. Granular Cradle - Sieve Analysis and Sample
- C. Granular Backfill - Sieve Analysis and Sample
- D. Boring and Jacking Plan.
- E. Potable Water Distribution Line Disinfection.

PART 2 PRODUCTS

2.01 PIPING MATERIALS AND FITTINGS

- A. Piping materials and fittings shall be as specified in Section 15260 and as shown on the plans.

2.02 GRANULAR CRADLE

- A. The granular cradle material shall as shown on the plans.

2.03 GRANULAR BACKFILL

- A. Granular backfill materials shall be as shown on the plans.

PART 3 EXECUTION

3.01 INSTALLATION

A. Buried Piping Systems

All buried piping shall have a compacted granular cradle as shown on the drawings. The granular backfill shall be used in locations where piping runs of any kind cross roadways, where one pipe crosses another and where piping spans from undisturbed earth to the wall of the structure. Where one pipe crosses another, or spans to a building wall, granular backfill shall be used to the midpoint of the highest pipe. The types of granular cradle and granular backfill materials shall be as shown on the plans.

B. Excavation and backfill shall include all excavation, backfilling, compacting, disposal of surplus material, and all other work incidental to the construction of trenches, including any additional excavation which may be required for manholes or other structures forming a part of the pipe line.

C. All buried PVC pipe shall be installed with a parallel 12-gauge copper wire within six inches above the pipe. The wire shall be continuous without splices. Wire shall terminate at structures or hydrants approximately 12 inches above grade.

1. Construction Methods

Depth of Pipe Cover: Unless otherwise shown or directed, all pipe shall be laid to minimum depth of three feet measured from the existing ground surface or established grade to the top of the barrels of the pipe. In areas subject to subsequent excavation or fill, the pipes shall be laid to grades provided by the Engineer.

Excavation: The trench shall be dug to the depth and alignment required and only so far in advance of pipe laying as the Engineer shall permit. The trench shall be so braced and drained that workmen may work therein safely and efficiently. The Contractor shall note that excavations shall conform to the latest OSHA requirements for excavations. It is essential that the discharge from pumps be led to natural drainage channels or to drains. The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures and piping, both known and unknown, may be determined, and he shall be held responsible for the repair of such structures and piping when broken or otherwise damaged by him.

Width: The trench width may vary with and depend upon the depth of the trench and the nature of the excavated material encountered, but in any case shall be of ample width to permit the pipe to be laid and jointed properly and the backfill to be placed and compacted properly. The minimum width of unsheeted trench shall be 2'-6".

Pipe Foundations: The trench, unless otherwise specified, shall have a curved bottom conforming to the pipe diameter and the grade to which the pipe is to be laid. The pipe shall be laid on compacted granular cradle so that the barrel of the pipe will have a bearing for its full length. Reliefs shall be excavated for joints.

Thrust Restraint: **RETAINER GLANDS SHALL BE USED ON ALL BURIED MECHANICAL JOINT VALVES AND FITTINGS. Use thrust blocks only where shown on the drawings, otherwise use retainer glands.** Poured concrete thrust blocks shall be used on all cast iron, ductile iron, and concrete fittings, 22-1/2° bends and greater, tees and plugs where the thrust block can be poured to bear on undisturbed earth. Thrust blocks shall be installed on all piping systems.

All PVC Forcemain bends, tees, wyes, plugs, fittings, or other significant changes in alignment shall be braced with poured concrete thrust blocks. For Forcemain, fittings connected to PVC pipe with retainer glands will not be allowed. See drawings for thrust block details.

Thrust blocks on all other piping systems shall be installed with thrust blocks as detailed on the drawings. The thrust blocking shall be sized with a bearing surface such that the soil pressure loads resulting from the pipe's maximum internal operating pressure times a 2.5 multiplier does not exceed 1500 psf unless noted otherwise.

2. Granular Cradle

All granular cradle materials shall be compacted to a minimum of 95% Standard Proctor Density in accordance with ASTM D698 and at not more than 2% below nor more than 3% above the optimum moisture content.

Overexcavation Backfill Requirement: In cases where the trench excavation is carried beyond or below the lines and grades given by the Engineer, the Contractor shall, at his own expense, backfill all such excavated space with granular cradle material in layers not to exceed eight (8) inches in thickness and compact each layer solidly in place. Where, in the opinion of the Engineer, the excavation has been carried excessively below the lines and grades given by the Engineer, the Contractor shall be required to have a minimum of one moisture density test, in accordance with ASTM D698 (Standard Proctor Test) made on the backfill material. The Contractor shall be responsible for all Standard Proctor Density Tests required for this backfill and costs for the tests shall be considered incidental to the work. Once the Standard Proctor Tests have been run, the Contractor shall, at his own expense, refill all such excessively excavated space. The backfill material shall be placed in 6 to 8 inch layers and then compacted to a minimum of 95% Standard Proctor density or that necessary to prevent settlement. Compaction of granular cradle materials within three feet of the walls of a structure shall be accomplished by the use of hand operated compaction equipment. Use of heavy compaction equipment within three feet of the walls of a structure will not be allowed. Compaction of backfill by jetting shall not be permitted under any circumstances.

3. Granular Backfill

All granular backfill material shall be compacted in maximum 8" lifts to a minimum of 95% Standard Proctor Density in accordance with ASTM D698 and at not more than 2% below nor more than 3% above the optimum moisture content .

Care shall be taken during backfilling operations so that adjacent newly placed concrete will not be disturbed as a result of vibration due to compaction equipment.

No frozen materials shall be placed in pipe trenches as backfill materials.

4. Pipe Laying

- a. Laying of pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surface.
- b. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipe shall be laid to conform to the prescribed lines and grades shown on the plans, with the limits that follow. Laser equipment shall be used for laying gravity piping.
- c. Variance from established line and grade shall not be greater than one thirty-second ($1/32$) of an inch per inch of pipe diameter and not to exceed one-half ($1/2$) inch, provided that any such variation does not result in a level or reverse sloping invert; provided also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed one sixty-fourth ($1/64$) per inch of pipe diameter, or one-half ($1/2$) inch maximum.
- d. Gravity piping, unless otherwise approved by the Engineer, shall be laid up grade from point of connection to the existing piping or from a designated starting point. The pipe shall be installed with the bell end forward or upgrade, unless approved otherwise. When pipe laying is not in progress the forward end of the pipe shall be kept tightly closed with an approved temporary plug.
- e. The Forcemain may, during construction, be deflected at its joints, but under NO circumstances shall the deflection at any joint exceed the recommended limits of the manufacturer. PVC pipe may be curved to accommodate small deflections in accordance with the recommendations of the manufacturer.

3. Miscellaneous Pipe Construction Requirements

Braced and Sheeted Trenches: Whenever necessary to prevent caving, excavations in sand, gravel, sandy soil or other unstable materials shall be adequately sheeted and braced. Where sheeting and bracing are used, the trench width shall be increased accordingly. Trench sheeting shall remain in place until the pipe has been laid, tested for defects, and repaired if necessary, and the backfill around it compacted to a depth of two feet over the top of the pipe.

Trenching by Machine or by Hand: The use of trench digging machinery will be permitted except in places where operation of same will cause damage to trees, buildings or existing structures above or below ground, in which case hand methods shall be employed.

Flow of Drains and Sewers Maintained: Adequate provision shall be made for the flow of sewers, drains and water courses encountered during the construction and the structures which may have been disturbed shall be satisfactorily restored upon completion of the work.

Property Protection: Trees, fences, poles and all other property shall be protected unless the removal is authorized and any property damaged shall be satisfactorily restored by the Contractor.

Manner of Handling Pipe and Accessories in the Trench: Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient completion of the work. All pipe fittings, valves and hydrants shall be carefully lowered into the trench, piece by piece, by means of derrick, ropes or other suitable tools or equipment in such manner as to prevent damage to pipe or pipe coating. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

Piling Excavated Material: All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing roadways. Fire hydrants under pressure, valve pit covers, valve boxes, manholes, electrical vaults, or other utility controls shall be left unobstructed and accessible until the work is completed. Natural watercourses shall not be obstructed. Surplus material and excavated material unsuitable for backfilling shall be transported and disposed of off the site in disposal areas obtained by the Contractor.

Removal of Water: The Contractor shall at all times during construction provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavations or other parts of the work until all work to be performed therein has been completed. No water containing settleable solids shall be discharged into storm sewers. The proposed method for controls of groundwater shall be submitted to the Engineer for approval.

Pipe Kept Clean: All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered in its position in the trench, and it shall be kept clean by approved means during and after laying. If, in the opinion of the Engineer, the pipe contains dirt that will not be removed during the flushing operation, the interior of the pipe shall be cleaned and swabbed, as necessary, with a bactericidal solution made up with calcium hypochlorite, chlorinated lime or sodium hypochlorite.

Preventing Trench Water From Entering Pipe: At times when the pipe laying is not in progress, the open ends of the pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.

Cutting Pipe: Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a workmanlike manner without damage to the pipe.

Permissible Deflections of Joints: Whenever necessary to deflect pipe from a straight line either in a vertical or horizontal plane to avoid obstructions, to plumb stems, or where long radius curves are permitted, the degree of deflection shall be no greater than recommended by the pipe manufacturer and shall be approved by the Engineer.

Plugging Dead Ends: Plugs shall be inserted into the joints of all dead end pipes, tees or crosses.

Barricades, Guards and Safety Provisions: To protect persons from injury and to avoid property damage, adequate barricades, construction signs, lights and guards as required shall be placed and maintained by the Contractor at his expense during the progress of the construction work and until it is safe for traffic to use the roadways. All material piles, equipment and pipe which may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. The rules and regulations of OSHA and the appropriate authorities respecting safety provisions shall be observed.

Structure Protection: Temporary support, adequate protection and maintenance of all underground and surface structures, drains, piping and other obstructions encountered in the progress of the work shall be furnished by the Contractor at his expense. The structures which may have been disturbed shall be restored upon completion of the work.

Disinfection of Completed Potable Water Pipe Lines:

- a. Before being placed in service, all new pipe lines which will carry potable water or any valved sections thereof shall be disinfected to guard against a contaminated water supply. Disinfection will not be required for sewage force mains.
- b. Disinfection shall be accomplished in accordance with the provisions of AWWA Specification C-601, latest revision.

- c. In the process of disinfecting newly laid pipe, valves and other appurtenances shall be operated while the pipe line is filled with the disinfection agent. Following disinfection, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its length shall, upon test, both chemically and bacteriologically, be proved equal to the water quality served the public from the existing water supply.
- d. Repetition of Procedure: Should the initial treatment fail to result in satisfactory results, as specified above, the original disinfection procedure will be repeated until satisfactory results are obtained. The results of laboratory examination by the State certified laboratory shall be conclusive in determining whether or not the water quality is acceptable.

Cleaning Up: Surplus pipe line materials, tools and temporary structures shall be removed by the Contractor; and all dirt, rubbish and excess earth from excavation shall be hauled to a landfill by the Contractor, and the construction site shall be left clean, to the satisfaction of the Construction Manager and the Owner.

Compaction Limits: All granular backfill and structural backfill materials shall be compacted with portable, hand operated type compactors when the backfilling is within 3 feet of a structure wall or up to 2 feet minimum above the top of the pipe in the trench. In other areas where accessible larger compaction equipment may be utilized.

Concrete Cradle: Where subgrade conditions, in the opinion of the Engineer, warrant extra precautions for the bedding of pipe, the Engineer may order the construction of a concrete cradle to be installed. The design requirements for a concrete cradle shall be furnished by the Design Consultant. Payment for the concrete cradle shall be by Change Order as extra work.

D. Above Ground Piping System

1. General

All pipe of 3-inch or larger diameter shall be accurately placed and installed in accordance with the plans and shop drawings. Pipe smaller than 3-inch diameter shall be placed and installed as shown or indicated on the plans and/or diagrams, as specified or as required to make a complete installation.

All prefabricated pipe shall be manufactured to accurate measurements in accordance with the plans and specifications. Measurements and dimensions shown on the plans for prefabricated pipe which is to meet or join existing piping or the clearance of which is controlled by the Contractor, and the measurements and dimensions as used for fabrication of the pipe shall be his entire responsibility.

Piping and tubing which is to be fabricated in the field shall be cut accurately to measurements established at the structure by the Contractor and shall be worked into place without springing or forcing. Care shall be taken not to weaken the structural portions of the structure. Piping and tubing shall be run parallel with the lines of the structure unless otherwise shown or noted on the drawings. Pipe, valves, and fittings shall be kept a sufficient distance from other work to permit easy accessibility for installation and maintenance. The whole assemblage of pipe and tube work shall be neat, orderly, and performed in a thorough workmanlike manner. Where several lines of small piping extend parallel and adjacent to each other, they shall be nested and supported in suitable racks, which in turn, shall be properly supported. No pipe shall be buried in floors unless specifically indicated on the drawings or approved by the Engineer or Design Consultant. Changes in sizes shall be made by the use of reducing fittings. The use of nipples and bushings will not be permitted. Whether or not specifically indicated on the plans, each branch of plant water, city water, natural gas or air piping shall be independently valved. A sufficient number of unions shall be incorporated in all pipe and tubing work to permit removal of any portion of the piping work, without the forced removal of undue lengths of adjacent piping.

Flanged cast iron pipe, ductile cast iron pipe, and steel pipe systems shall be constructed of flanged pipe and fittings hereinbefore specified. Flanges shall be faced true. Full faced gaskets shall be used. Provisions for adjustments in dimensions at openings for equipment shall be provided by use of spool pieces, flange fillers, or shims, as required. When the bolts of the system are made up tight, strain or stress shall not be introduced into the flanges of the equipment connected to the system.

Stud bolting in piping shall be used only in locations where regular headed bolts cannot be removed for maintenance. Where used, the stud bolts and nuts shall be bronze or stainless steel.

2. Pipe Hangers, Inserts and Supports

The Contractor shall provide specified hangers and supports as required to support the piping system in a first class workmanlike manner. No attempt has been made to show all necessary pipe hangers and supports. Under no circumstances shall pumps and similar pieces of equipment carry the weight of connected piping. Provide all necessary concrete inserts required for the attachment of hangers and supports.

Inserts shall permit adjustment of the bolt in one horizontal direction and shall be installed before the concrete is poured, except where indicated on the plans. The insert shall be galvanized malleable iron, and shall be of a type to receive a machine bolt head or nut after installation. Self drilling expansion anchors when used shall be adequate for the load supported. Hangers and supports shall be installed at dimensions not to exceed the maximum limits listed below and at intervals required to keep the pipe in alignment and to carry the weight of the pipe and contents.

All hangers and/or pipe support assemblies, including all structural shapes, saddles, clevis, and clamps, shall be hot dipped galvanized except for those items that are stainless steel or shown otherwise. All support rods, anchor bolts, nuts and washers shall be either Type 303 or 304 stainless steel.

All horizontal pipe requiring suspension from the ceiling shall be supported using galvanized adjustable clevis hangers Grinnell Fig. 260, or equal, unless shown otherwise. All horizontal pipe requiring support from a wall shall be a galvanized steel bracket either Grinnell Fig. 195 or Fig. 199, or equal, depending on the load support requirements.

The piping shall be secured to the wall brackets with galvanized steel pipe straps. Horizontal piping requiring floor support shall be supported by cast iron adjustable pipe saddle supports Grinnell Fig. 264, or equal, and galvanized schedule 40 steel pipe.

Vertical piping passing through floors shall be supported with galvanized steel riser clamps Grinnell Fig. 261, or equal. Vertical piping 4 inch and smaller shall be supported by galvanized Unistrut No. P2542 thru No. P2546, or equal, depending on the pipe size and length and clamped with galvanized steel pipe clamps.

Horizontal piping hangers and supports shall be installed as specified hereinafter, and at locations not more than 3 feet from the end of each run-out. Hangers shall be installed not over 1 foot from each change in direction of piping. Hangers and turnbuckles shall be of a type suitable for the particular installation and will be subject to the approval of the Engineer. Brackets of an approved design may be used for the support of piping at walls, in lieu of the brackets specified above.

Cast iron pipe or ductile iron pipe shall be supported at intervals not to exceed 10 feet, either horizontally or vertically.

Schedule 40 PVC piping shall be supported at intervals not to exceed 4 feet either vertically or horizontally.

3.02 PIPE TESTING

A. General Notes:

1. Deep piping shall be tested prior to completing backfilling or covering with concrete.
2. All piping systems shall be tested. Engineer shall provide test pressures for all piping systems during construction.

B. Sanitary Sewer and Drain Line Testing

The Contractor shall be required to test all the sanitary sewers and drain lines installed on this project and all sections will be required to pass testing as outlined below. Testing shall be in accordance with the applicable provisions of Section 31-1.11 of the Standard Specifications for Water & Sewer Main Construction in Illinois (latest revision), except as modified herein.

Leakage tests shall be performed after the lines have been cleaned and the trench backfilled.

All gravity sanitary sewers and drain lines shall be tested by Method A, exfiltration of water or Method C, exfiltration of air. The appropriate method of leakage testing shall be determined by the Engineer based on field conditions. Along the section of sewer to be tested, the Contractor shall determine the groundwater level at each end manhole and at all intermediate manholes. The groundwater level outside each manhole shall be measured outside the manhole by excavation down to the sewer to be tested, or shall be measured in the manhole by the use of clear tubing and piping which extends through the manhole wall at or below the top of the sewer pipe to be tested. The hole through the manhole shall be sealed following successful completion of all leakage testing.

All manholes shall be included in the water exfiltration and infiltration test methods. If the exfiltration of air method is used, manholes shall be separately tested by water infiltration or exfiltration test. If the infiltration method is used, the ground around the manhole shall be soaked and water standing up to the top of the manhole. Manholes shall be bottle tight with no leakage.

The Contractor shall furnish the water to be used during the test when the exfiltration method of testing is used. If the City water system is used, all water shall be metered and the Contractor shall pay the City according to their current rates. All sewers shall be required to meet allowable leakage criteria as contained in the Standard Specifications. If any section fails to meet the test, the section shall be repaired or replaced at the Contractor's expense and retested until it meets the leakage limits. Pressure grout or concrete encasement will not be acceptable methods of repair of joints.

The Contractor shall be required to conduct deflection testing on each type of flexible sewer pipe or drain (ABS and PVC composite and PVC sewer pipe). Deflection testing shall be performed on all flexible sewer which is installed. Sections of sewer shall be tested no sooner than 30 days after the sewer has been installed. Where feasible, testing shall be initiated at the downstream sections of the sewer and be followed by the upstream sections. Testing shall be performed by pulling through the sewer by hand a rigid ball or mandrel having an outside diameter equal to 95% of the base inside diameter of the pipe as established in the ASTM Standard D3034. Base inside diameter shall be determined for truss pipe in a similar manner to that used for PVC pipe. Other instruments for measuring deflection may be used if they are approved by the Engineer.

Deflection of flexible pipe shall not exceed 5% of the base inside diameter. In the event that the deflection exceeds the 5% limit in 10% or more of the manhole intervals tested, the total sewer project shall be tested.

Where deflection is found to be in excess of 5% of the original pipe diameter, the Contractor shall excavate to the point of excess deflection and carefully compact around the point where excess deflection was found. The line shall then be retested for deflection. However, should after the initial testing the deflected pipe fail to return to the original size (inside diameter), the line shall be replaced.

D. Ductile Iron Piping and Polyvinyl Chloride Piping (PVC) Forcemain System

The sanitary forcemain on this project shall be tested as described here. After the forcemain has been laid and backfilled, it shall be subjected to a hydrostatic pressure water test of not less than one and one-half (1.5) times the normal operating pressure introduced at the lowest point of the forcemain. Duration of the pressure test shall be not less than two (2) hours and not greater than six (6) hours and the leakage during the test shall not be greater than the limit specified below.

Procedure for Test: Each valved section of pipe or forcemain shall be slowly filled with water. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterwards tightly plugged. Temporary plugs shall be installed at the ends of the forcemain if there are no valves. Then the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump pipe connection and all necessary apparatus including gages and meters shall be furnished by the Contractor. All joints showing visible leaks shall be repaired until tight. Any cracked or defective pipes, fittings, valves, or hydrants discovered in consequence of this pressure test shall be removed and replaced by the Contractor with sound material and the test shall be repeated until satisfactory to the Engineer.

Permissible Leakage: Suitable means shall be provided by the Contractor for determining the quantity of water lost by leakage under the specified test pressure. Leakage is defined as the quantity of water to be supplied in the newly laid pipe or any valved section of it necessary to maintain the specified leakage test pressure after pipe has been filled with water and the air expelled. During the test, the pressure shall be maintained between +/- 3 psi of the test pressure as described above.

The allowable leakage in gallons per hour shall not be greater than that determined by the following formula:

$$L = \frac{NDP^{0.5}}{3700}$$

Where,

- L = Allowable leakage in gallons per hour.
- N = Number of joints in length of pipeline tested (push-on or mechanical joint).
- D = Nominal diameter of pipe in inches.
- P = Average test pressure during leakage test in pounds per square inch (psi) gauge.

Flanged pipe shall be "bottle tight."

The Contractor shall arrange for and make any necessary payment for water necessary for forcemain testing.

Repairs or Replacement: If the pipeline fails to meet the hydrostatic or leakage test requirements, the Contractor shall find the cause for the failure, make the necessary repairs or replacements, and repeat the test until satisfactory to the Engineer. The cost of testing the forcemain shall be included in the cost of installing the forcemain and no separate payment shall be made.

E. Plant Water and Potable Water Service Lines (Reserved)

END OF SECTION 15265

DIVISION 15 - MECHANICAL
Section 15270 - Valves

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. The work included in this section is the supply and installation of all piping valves and accessories necessary for their proper operation as shown on the drawings and specified herein. All valves shall be standard commercial products of reputable manufacturers.

1.02 RELATED WORK

- A. Section 15260 - Plant Pipes and Fittings
- B. Section 15265 - Piping Installation

1.03 QUALITY ASSURANCE

- A. The contractor shall establish and maintain quality control of all valves and accessories on the project. To assure contract compliance, the contractor shall maintain records of his quality control efforts as listed below.
- B. Check for damage to and defects in material.
- C. Check for proper storage of valves and accessories and provide a systematic list of valves and accessories on site along with their location.
- D. Check to see that all valves and accessories incorporated into the piping system have been submitted and reviewed.
- E. Coordinate valve submittal and piping submittals to assure correct dimensions, etc.

1.04 REFERENCE TO STANDARDS

- A. References to standards are included in the text for each type of valve.

1.05 SUBMITTALS

- A. Submittals shall meet the requirements of Section 01300 - Submittals.
- B. All types of valves shall be submitted for review. Sufficient information shall be presented to allow proper evaluation. Complete dimensional information is required.
- C. The submittals shall reference the plan sheets and indicate the intended use for the valve submitted.

1.06 STORAGE AND HANDLING

- A. Valves shall be stored on site on pallets and kept free from sand and other debris. Storage shall be such that no water is trapped in or on any part of the valves.
- B. Valves shall not be lifted by the handwheel or operator. Manufacturer's recommendation for handling must be followed.

1.07 WARRANTY

- A. The valves furnished and installed are subject to the one year warranty provisions of the General Conditions.

PART 2 PRODUCTS

2.01 PLUG VALVES

- A. Plug valves shall be as specified below. The plug valves for general standard pressure service shall be non-lubricated DeZurik Eccentric Figure 118, or equal.
- B. General standard pressure service manually actuated plug valves shall be provided with lever operator (Fig. 344) on valves 8" and smaller and worm gear actuators (AGG6H12) on valves 10" and larger, unless otherwise specified or shown on Drawings. For manually actuated plug valves showing floor stands, the floor stand shall be of the non-rising stem type equipped with indicator to show the valve position.
- C. Port areas shall be at least 80% of full pipe area. Bodies shall be cast iron and conform to AWWA C507, Sec. 5.1 and C504, Sec. 5.4. Seats in 3" and larger valves shall have a welded in overlay of not less than 90% pure nickel on all surfaces contacting the plug face. Valves shall have stainless steel permanently lubricated upper and lower plug stem bearings. All 4" and larger shall be of the bolted bonnet design. The valves shall be designed so that they can be repacked without removing the bonnet from the valve. All nuts, bolts, springs and washers shall be stainless steel.
- D. Flanged valves shall be faced and drilled to ANSI B16.1 Standard. Flanged bodies through 12" size shall have face to face dimensions of standard gate valves.
- E. Buried plug valves shall be eccentric, non-lubricated, DeZurik Figure 118, Henry Pratt, or equal, with mechanical joint ends. Valve boxes shall be furnished with extension stems and actuating nut extended to the top of the box. The valve box shall extend to the ground surface. A tee wrench shall be provided for the buried valves. Buried and submerged valves shall be furnished with a completely sealed actuator. All non-buried valves shall be furnished with flanged ends complying with ANSI B16.1 and cast iron hand wheels. Valves with centerlines more than 6'-0" above a finished floor elevation shall be provided with hot dipped galvanized chain wheel operators and guides and galvanized chain as previously defined.

- F. General standard pressure service plug valves shall be provided with Nitrile-Butadiene packing, Nitrile-Butadiene (Hycar) plug facing and flanged or mechanical joint end style as shown on the plans.
- G. All plug valves and accessories shall be provided as a package by the same manufacturer.

2.02 GATE VALVES

A. Knife Gate Valves

Valves shall be of the bonnetless knife gate type with wafer face-to-face flanged connections. Raised face flange shall be drilled to ANSI 125/150 pound standard. C.W.P. valve rating shall be 150 psi in sizes 2"-24" and 125 psi in sizes 30" and 36".

Valves shall be resilient seated. Valve bodies can be furnished with all wetted parts of type 304 stainless steel.

Valve packing shall be multiple layers of square, braided flax. The gate shall have a rounded bottom with a beveled knife edge. All sides of the gate shall be finish ground. The stem shall be stainless steel. Valve superstructure shall be fabricated carbon steel. The yoke sleeve shall be bronze. The valve body shall incorporate guides (on sizes 6" and larger) and jams to assist the seating. Valves shall have a raised face seat with a relieved area around the seat to prevent jamming.

Resilient seated valves shall have a seat ring with a molded resilient insert to the body and gate sides for installations where drip-tight shutoff is required. Resilient seat material shall be chloroprene.

Manual actuated valves 2"-12" shall have handwheel actuators. Valves 14" and larger shall be equipped with bevel gear actuators. Valves with centerlines more than 6'-0" above a finished floor shall be provided with hot dipped chain wheel operators and guides and galvanized chain.

All valves shall be DeZurik Series "L" Knife Gates or equal.

B. Gate Valves 3 Inches and Smaller (Not Buried)

The small gate valves which are not buried shall be of all bronze construction, threaded or flanged ends as required and operate at a working pressure of 150 psi. The valves shall be rising stem with wedged disc and TFE non-asbestos packing, and have malleable iron handwheels. The gate valves shall be Stockham B-100, or equal.

C. Gate Valves 3 Inches and Smaller (Buried)

The small gate valves which are buried shall be iron body, bronze mounted, double disc, non-rising stem, mechanical joint ends and comply with AWWA C111 and ANSI A21.11. The valves shall open counterclockwise and shall be furnished with valve boxes and extension stems. Valves being connected to PVC pipe shall be furnished with transition gaskets. The valves shall be Mueller Co., No. A2380-22, or equal.

D. Gate Valves 4 Inches and Larger

All gate valves shall be non-rising stem, iron body complying with AWWA C111 and open counterclockwise. The gate valves in sizes 4" through 12" shall be resilient seat and for valves 14" and larger shall be bronze mounted, double disc and parallel seat. All buried valves shall be furnished with mechanical joint ends, retainer glands, cast iron valve boxes, and extension stems to the finish grade with square wrench nuts and comply with ANSI A21.11. All non-buried valves shall be furnished with flanged ends complying with ANSI B16.1 and cast iron hand wheels. Valves with centerlines more than 6'-0" above a finished floor elevation shall be provided with hot dipped galvanized chain wheel operators and guides and galvanized chain as previously defined. The gate valves shall be as follows:

4" to 12"	Mechanical Joint	Mueller No. A2370-20, or equal
4" to 12"	Flange Ends	Mueller No. A2370-6, or equal
14" and Larger	Mechanical Joint	Mueller No. A2380-22, or equal
14" and Larger	Flange ends	Mueller No. A2480-6, or equal

2.03 BUTTERFLY VALVES (RESERVED)

2.04 CHECK VALVES

A. Check valves shall be as specified below.

1. Valves 3 Inches and Smaller

The small check valves shall have a Y-pattern bronze body, bronze cap, a composition swing disc, threaded ends, and operate at a working pressure of 200 psi. The valves shall be certified by the valve manufacturer as being suitable for their intended use. The valves shall be Stockham B-321 Henry Pratt, or equal.

2. Valves 4 Inches and Larger (Swing Check Valves)

The check valves shall be flanged and drilled to conform to ANSI B16.1 and B16.10 Class 125, rated at a working pressure of 200 psi and have plain face flanges with smooth finish. The valves shall have a cast iron body conforming to ASTM A126 Class B and have bronze trim with the disc of solid bronze for 6 inch and smaller and bronze-faced iron for larger sizes. All valves shall have replaceable bronze seat rings, hinge-pin and bushings. The valves shall have an outside lever and weight, and a 13% chromium stainless steel hinge-pin extending out one side of the body through a

stuffing box with replaceable and adjustable packing. The check valves shall be Stockham G-933, or equal. The swing check valves shall be installed at all check valve locations noted on the plans.

2.05 HYDRANTS (RESERVED)

2.06 VALVE BOXES (RESERVED)

2.07 EXTENSION STEMS

A. Buried Valves

All buried valves shall have galvanized extension stems keyed to the valve and the operating nut brought to within 6" of the surface.

B. Non-Buried Valves

Extension stems shall be 304 stainless steel.

2.08 STEM GUIDES

A. Cast iron stem guide are required at 6 ft. intervals on non-buried valves. Stem guides shall be as manufactured by Rodney Hunt, or equal.

2.09 TELESCOPIC VALVES (RESERVED)

2.10 FREEZELESS YARD HYDRANTS (RESERVED)

2.11 ELECTRICALLY OPERATED CONTROL PINCH VALVE (RESERVED)

2.12 MUD VALVES (RESERVED)

2.13 DUCKBILL CHECK VALVES

A. Provide and install duckbill valve where shown on the Drawings.

B. Check valves are to be all rubber and the flow operated check type with a slip-on connection. The check valve shall be designed to slip over the outside diameter of the pipe material at the location(s) shown on the drawings.

C. The port area shall contour down to a duckbill which shall allow passage of flow in one direction while preventing reverse flow. The valve shall be one-piece rubber construction with nylon reinforcement. The duckbill shall be offset so that the bottom line of the valve is flat, keeping the invert of the pipe parallel with the invert of the valve. The top of the valve shall rise to form the duckbill shape. The bill portion shall be thinner and more flexible than the valve body and formed into a curve of 180°.

D. Manufacturer must have available flow test data from an accredited hydraulics laboratory to confirm pressure drop data. Company name, plant location, valve size and serial number shall be bonded to the check valve.

- E. When line pressure inside the valve exceeds the backpressure outside the valve, the line pressure forces the bill of the valve open, allowing flow to pass. When backpressure exceeds the line pressure, the bill of the valve is forced closed.
- F. The valve shall be installed in accordance with the manufacturer's written installation and operation manual and approved submittals.
- G. All valves shall be of the Series TF-1 as manufactured by Tideflex Technologies, Pittsburgh, PA, or approved equal.

2.14 AIR RELEASE VALVE AND VAULT

- A. The Contractor shall furnish and install sewage combination air valves and vaults as detailed on the drawings and at the locations shown on the drawings.
- B. The sewage combination air valves shall have backwash accessories, short body, and shall be ARI D-025P, APCO Sewage Air Valve Model No. 445, or Val-Matic. No substitutes allowed.
- C. The Contractor shall furnish and install the piping and accessories necessary to install the sewage combination valves.
- D. The concrete vault shall be a pre-cast concrete Type C-5 manhole meeting ASTM Specification C-478 and the steps shall conform to the Manhole Specification – Section 02607 of these specifications, except as modified on the drawings. The manhole casting shall be a Neenah R-1960 with Type B lid (labeled "SANITARY"), East Jordan, Deeter, or equal. The frame shall be cast in the top slab of the vault.

PART 3 EXECUTION

(RESERVED)

END OF SECTION 15270

SECTION 16961
STORM WATER SAMPLING EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

- A. This performance-based specification requires the contractor to provide and install complete and functional sampling systems that will determine BOD and ammonia levels in storm water as shown on the drawings and detailed in these specifications. Each analyzer will provide, upon the increased presence of ammonia and/or BOD demand an output signal that can be utilized to change the status of slide gates on the storm water system. The system shall include but not be limited to the ammonia analyzer in wall-mount enclosure, BOD analyzer in a movable cart, control panel and associated components to house the BOD analyzer in a prefabricated shelter building, sampling pump, sample pump floats, sampling and return piping, and all valves & fittings required for a complete system. Pump and pipe sizes have been shown on the drawings but it is the responsibility of the contractor to verify the functionality of the complete system. If any components of the system will not provide a satisfactory sample it must be brought to the attention of the owner's representative prior to supply of the equipment.
- B. Provide all materials and labor required to fabricate brackets and mountings and make penetrations for instrumentation as required by the manufacturer, as detailed in this specification, and as shown on the drawings.
- C. Provide an identification tag for each piece of equipment or instrument as indicated on the drawings. Tags shall be brass or plastic laminate.
- D. Retain all documentation, manuals, and instruction sheets supplied with devices. Organize documents by device and furnish to Owner's Representative along with device.

1.02 SUBMITTALS

- A. Submit certified shop drawings of all equipment and devices to the Owner's Representative for approval prior to order or installation of devices.
- B. Submit three copies of manufacturer's installation and maintenance documentation to the Owner's Representative prior to installation of devices.
- C. Submit mounting details for approval prior to installation of devices.
 - a. Sample Pumps
 - b. Sample pump floats
- D. Submit ammonia analyzer and BOD analyzer panel layouts and bill of material.
- E. Submit maintenance schedules for ammonia and BOD analyzers.

1.03 QUALIFICATIONS

- A. Manufacturer: Provide specified manufacturer or equal required for complete and functional system.

1.04 RELATED SECTIONS

- A. Work this section with Section 16903 – Programmable Logic Controller.

PART 2 - PRODUCTS

2.01 Ammonia Analyzer

- A. Furnish an ammonia analyzer monitoring system as detailed herein and as shown on the contract drawings. The ammonia analyzer shall be suitable for measuring ammonia content of a pumped sample flow stream. The contractor is responsible for providing a complete and functional sample supply pump and analyzer system.
- B. The ammonia analyzer shall be located in a pre-fabricated shelter building. Panel shall be NEMA 4, fiberglass enclosure and be approximately 13" by 15" by 7" deep.
1. The analyzer shall use electrochemical sensors specifically suited for the measurement of ammonia in storm water. Methods and reagents shall be optimized for the best response, minimal interferences and improved detection limits.
 2. The ammonia analyzer shall be capable of a response time of less than 3 minutes to the 90% response, have zero drift of less than 1% over 24 hours, and be capable of measuring ammonia in the range of 0 to 100 parts per million.
 3. The integrated assembly shall include a local digital read-out
 4. The integrated assembly shall include reagent tanks as required for proper operation of the analyzer.
 5. A particulate filter shall be provided.
- C. The unit shall operate on 115 volt single-phase power.
- D. The ammonia analyzer shall have four programmable set points, dual alarm relay contacts, and a 0-1V DC output configured for the sensing range of the unit and the ability to store 90 days worth of data. A visual and audible alarm shall be provided. An RS232 output data connection shall also be provided.
- E. Provide one trip with two days of time for installation verification, start-up, calibration and training. Include travel expenses as required.
- F. Provide the following with the ammonia analyzer
1. Reagents as required for sensing ammonia.
 2. Spare probe/sensor(s)
 3. Spare particulate filter device
- G. The ammonia analyzer shall be Model 610 NH3 Water Quality Analyzer from Process Analyzers, LLC of Walpole, MA or equal.

2.02 BOD Analyzer

Furnish a BOD measuring system as detailed herein and as shown on the contract drawings. The BOD analyzer and sample pump shall be suitable for the distance and pipe size shown on the drawings to allow for the proper flow and pressure at the analyzer. The contractor is responsible for providing a complete and functional sample supply pump and analyzer system.

- H. The BOD analyzer shall be located in a pre-fabricated shelter building. Analyzer shall be provided as a free-standing rack. Panel shall comply with NEMA 3 specifications.
1. The integrated assembly shall include flexible potable water lines to allow for movement of the cart mounted unit.
 2. The integrated assembly shall include provisions for 2 flexible piping sample streams brought to the panel.

- i. Provide 2 connection points on the analyzer for a 2" sample line.
 - ii. Provide connection point on the analyzer for one 3" return line.
 - iii. Provide solenoid control valves for each sample line.
 - 1. The valves shall be 2 position, spring return to the default closed position. Valves shall be rated for 120 VAC.
 - 2. Control of the valves will be accomplished by a PLC system.
 - iv. Provide manual valves at the BOD building and at the sample pump to allow for manual flush of the sample line.
 - v. Provide piping and valves as required to comprise a complete system.
 - vi. Reference section 2.03 for sample pump to feed this assembly. The sample pump will be powered and controlled by others.
 - 3. The integrated assembly shall include reagent tanks as required for proper operation of the analyzer.
- I. BOD unit shall have the following features.
 - 1. Relay contact outputs configured as detailed herein and as shown on the drawings with Normally Open and Closed contacts rated for 120VAC(50-60Hz).
 - i. Alarm for low sample stream flow
 - ii. Alarm for low water/reagent.
 - iii. System on, running/sampling status
 - iv. General alarm for all other abnormal conditions.
 - 2. 4-20mA output configured for the sensing range of the unit.
 - 3. Analyzers will have a measurement range of 5 – 100,000 mg/l BOD, a response time no greater than 15 minutes,
 - 4. Analyzers will have maintenance-free particle separator sample preparation.
 - 5. Integrated modem for remote monitoring.
 - 6. The ability to store 90 days worth of data.
- J. The analyzer shall be provided with the following.
 - 1. one year of service and wear parts
 - 2. one calibration kit to homogenize sample during calibration
 - 3. Sample by-pass system
 - 4. one spare oxygen probe
- K. Provide one trip with two days of time for installation verification, start-up and training. Include travel expenses as required.
- L. The ammonia analyzer shall be Model BIOX 1015 BOD Analyzer from Endress & Hauser or equal.

2.03 Submersible Grinder/Sample Pump

A. GENERAL

Furnish and install submersible grinder pump, 2 HP, single phase, 240 volts, 60 Hz, in the storm water manhole as shown on the drawings and as specified herein. It is expected that the pump should be rated for a minimum flow of 20 GPM and 15 PSI max at the sampler. These figures shall be verified by the contractor and BOD analyzer supplier to confirm a proper sample stream will be provided. The pump shall have a float switch with encapsulated contacts rated for 120 VAC mounted on the pump in a position to assure the water level is high enough to allow the pump to operate. Provide a minimum of 25 ft. of cable from the pump and float switch to be terminated in the manhole.

B. PUMP DESIGN

Pump shall have 1-1/4 inch NPT vertical discharge increasing to 2 inch for the sample line to the building. The pump shall be capable of grinding domestic and raw sewage containing

small quantities of plastic, rubber, cloth, paper and other non-abrasive solids. Pump shall be suitable for operation with glycol containing storm water.

C. PUMP GRINDER ASSEMBLY

The grinder assembly shall consist of two hardened components mounted directly below the impeller. The two components shall be the rotating cutter ring both of which shall be constructed of type 440C stainless steel hardened to 55-60 Rockwell "C" scale value. The rotating cutter shall be threaded to the pump shaft. The cutter ring shall be pressed into the casing directly below the suction opening of the pump. The cutter ring shall then be secured by three type 300 series stainless steel screws for corrosion resistance. The stationary cutter ring shall be reversible such that once wear has occurred, the ring can be turned over and new, unused surfaces exposed. Each component shall be designed for long life and ease of service. All hardware shall be series 300 stainless steel.

D. PUMP MECHANICAL SHAFT SEALS

The motor shall be protected by a mechanical shaft seal mounted on the pump shaft. The mechanical seal faces shall be constructed of silicon carbide contacting silicon carbide. The spring system shall be constructed of series 300 stainless steel metal components and Buna-N elastomers. The seal faces shall be provided with mat and polished finish to provide optimal wear characteristics. Seal face materials other than silicon carbide shall not be allowed.

E. PUMP IMPELLER

The impeller shall be semi-open, non-clog, with ejector (pump out) vanes on the top of the impeller shroud for protection of the mechanical seal and to improve hydraulic balance. Only single plane dynamic balancing shall be required for smooth operation. The impeller shall be threaded to the shaft and not key driven. The impeller shall be designed such that the rotating cutter vanes can be accurately aligned to the impeller vanes for proper solids passage through the pump.

F. PUMP CASING

The casing shall be cast from ASTM A48 class 30 gray cast iron of sufficient thickness to withstand 1.5 times the shut off pressure generated by the largest impeller available for this model in accordance with current revision of the Hydraulic Institute Standards. The discharge connection shall be a standard NPT suitable for direct connection to the station piping, without the use of any external fittings or adapters for vertical orientation of the discharge direction.

G. PUMP CORROSION PROTECTION

The pump/motor shaft wetted-end shall be series 300 stainless steel. Both inner and outer surfaces of cast iron shall be electrocoat-painted with thermo-painted with thermo-setting Acrylic Enamel baked 20 minutes at 350 degrees F., after castings are completely machined.

H. PUMP MOTOR

The integral motor shall be completely sealed from the environment by use of circular cross section o-rings accurately fitted into machined grooves which shall provide designed compression of metal to metal fits. Designs which require a specific torque on the casing bolts or which require rectangular gaskets or sealing rings shall not be allowed. The motor shall be rated for continuous duty under full nameplate load while at partial submergence in the station. The motor shall be provided at the specified site conditions of 460 V, three phase power. The stator shall be a register fit into the bearing housing to ensure positive alignment, and bolted for ease of serviceability. The motor shall be provided with ball type anti-friction bearings which shall support the heavy-duty rotor shaft and to handle all radial and axial loads imposed by the impeller while limiting shaft deflection at the mechanical seal faces. Sleeve type bearings shall not be considered equal and shall not be allowed. The ball bearings shall be designed for a B-10 life of 30,000 hours minimum. The motor shall be designed and tested to withstand an 18-day locked-rotor operation without damage.

I. PUMP POWER CABLE

The power cable shall be sealed at the motor end as it enters the motor casing by a two part barrier to moisture intrusion. The barrier shall be the compression of the oil and chemical resistant grommet which shall seal the outer jacket of the power cord. In the event that the outer jacket of the power cord should become damaged, then the second line of defense shall be the epoxy poured isolated conductors within the jacketed cable itself. The insulation shall be removed from the individual conductors and the epoxy shall be allowed to form a leak-proof seal against wicking of the power cable between the outer jacket and the insulation of the individual conductors. The outer jacket of the power cord shall be oil resistant and water resistant. The power cable shall be rated for NEC severe service "S", type "STOW".

J. PUMP APPROVALS

The pump shall be UL or CSA approved. The pump nameplate shall have the approved markings and labels according to these approval agencies.

PART 3 – EXECUTION

3.01 BRACKETS AND MOUNTING

- A. Fabricate brackets for all pumps as necessary and as detailed on drawings (if applicable). Consult manufacturer's literature for special requirements prior to mounting. Submit mounting details to owner's representative and receive approval before fabrication. Field verify dimensions before fabrication.

3.02 MOUNTING AND INSTALLATION

- A. Fabricate brackets, mount and install devices as shown on drawings, specified herein, and in accordance with manufacturer's recommendations.
- B. Locations shown on drawings are approximate. Coordinate exact location of all field devices with Owner's Representative before making any penetrations and before final installation.

3.03 WIRING, VERIFICATION, AND CALIBRATION

- A. Wire devices as shown on drawings and in accordance with manufacturer's recommendations.
- B. Adjust all devices for proper operation per manufacturer's recommendations.
- C. Adjust and calibrate instruments as shown on drawings and in accordance with manufacturer's recommendations.
- D. Provide on-site manufacturer support during calibration and testing of the BOD analyzer.

END OF SECTION 16961

DIVISION 16 - ELECTRICAL
Section 16010 - General Electrical Requirements

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is general in nature and applicable to electrical system work. Contractor is also directed to other sections of Division 16 - Electrical for additional related specifications for items described in this section.
- B. Work included in this section shall apply to installation and testing of all materials and equipment necessary to completely install electrical system as shown on drawings and as described herein in these specifications, or as may be necessary for a complete and operational electrical system.
- C. Drawings pertaining to this installation indicate general location of conduits, wiring, distribution and motor control centers, lighting and outlets, and other details necessary for installation of system.
- D. Electrical installation as shown on drawings and as specified herein is based upon best available information, with regard to characteristics of mechanical equipment specified. In the event changes are necessary in order to accommodate mechanical equipment furnished, necessary revisions will be made with approval of Owner's representative.
- E. Any minor changes in location of equipment, to include conduits, outlets, etc., from those shown on drawings, shall be made without extra charge if so directed by Owner's representative. These changes shall be any changes in location that, had new location been the bid-upon location, would not have resulted in an increase in contract construction cost over that actually bid.
- F. All electrical equipment shall be installed in conformance with applicable sections of NPFA 70 - National Electrical Code, respective equipment manufacturer's directions, as detailed on drawings and as specified herein. Any installations which void U.L. listing (or other third party listing) and/or manufacturer's warranty of a device or equipment shall NOT be permitted
- G. RELATED CONTRACT WORK DESCRIBED ELSEWHERE IN THESE SPECIFICATIONS:

Electrical Contractor shall note that it is **not** the intent of these Division 16 specifications herein to be all-inclusive of electrically related work to be performed as part of this contract.

Contractor shall also comply with electrical requirements in these sections of the specifications, including, but not limited to, wiring of motors, control panels furnished by others, HVAC equipment and all other electrically powered equipment furnished by others under this project.

1.02 LAWS AND ORDINANCES

- A. In installation of this work, Contractor shall comply in every respect with requirements of National Electrical Code (NEC), National Board of Fire Underwriters, and any state and local requirements, laws and ordinances as may be applicable.
- B. If, in opinion of the Contractor, there is anything in drawings or specifications that will not strictly comply with above laws, ordinances and rules, the matter shall be referred to the attention of the Owner's representative for a decision before proceeding with that part of the work. No changes on drawings or in specifications shall be made without the full consent of Owner's representative.
- C. Contractor shall obtain and pay for all licenses, permits and inspections required by above laws, ordinances and rules for entire electric wiring job called for in these specifications and accompanying drawings.

1.03 DRAWINGS

- A. Drawings for electrical work will be a part of electrical drawings to which will be added, during the period of construction, any other detail drawings as may be necessary in opinion of Owner's representative, to show proper installation of various appliances or equipment with relation to project.
- B. Drawings and specifications are intended to be descriptive only, and any error or omissions of detail in either **shall not** relieve Contractor from obligations thereunder to install in correct detail any and all materials necessary for complete and operating electrical systems to extent shown on drawings and described in this specification.
- C. Contractor shall, during progress of job, record any and all changes or deviations from original drawings, and, at completion of project, shall deliver to Owner's representative a **single** marked-up set of "as-built" drawings.

1.04 SHOP AND ERECTION DRAWINGS

- A. This Contractor shall prepare shop drawings for all parts of his work. Before commencing any work or providing any material, Contractor shall submit for approval of Owner's representative all drawings relating to construction, arrangement or disposition of equipment entering into contract, and show complete equipment with manufacturer's specifications of same.
- B. Shop drawings of all distribution and motor control centers, panels, power and lighting systems, fixtures, wire, cables, devices, etc. shall be submitted for approval, as well as complete details of all systems not shown in detail on drawings.

- C. SHOP DRAWINGS SHALL BE FULLY DESCRIPTIVE OF ALL MATERIALS AND EQUIPMENT TO BE INCORPORATED INTO THIS PROJECT. CONTRACTOR SHALL CAREFULLY CHECK ALL SUBMITTED SHOP DRAWINGS, MAKING SURE THEY ARE COMPLETE IN ALL DETAILS AND COVER SPECIFIC ITEMS AS HEREINAFTER SPECIFIED.
- D. Shop drawings shall be submitted in sufficient quantity as required by the General Conditions. Three (3) copies will be retained by the Engineer for his use and records.
- E. No material or equipment shall be allowed at the site until shop drawings approved by the Engineer are received by the Resident Engineer at the site.
- F. The following information shall be clearly marked on each shop drawing, catalog cut, pamphlet, specifications sheet, etc. submitted:

PROJECT TITLE:

BRANCH OF WORK: ELECTRICAL

NAME OF BUILDING OR LOCATION:

PAGE OF DRAWINGS OR SPECS WITH WHICH EQUIPMENT COMPLIES:

DATE:

SUBMITTED BY:

PART 2 PRODUCTS

2.01 PRODUCTS SHALL BE AS SPECIFIED IN OTHER SECTIONS AND AS DETAILED ON THE DRAWINGS.

PART 3 EXECUTION

3.01 EQUIPMENT STORAGE

- A. All electrical equipment considered to be a part of this contract, to include, but not be limited to, motor control centers (MCC), starters, transformers, lighting fixtures, etc., shall be stored before installation in a warm, dry, indoor area so as to protect the equipment from physical damage, freezing, dirt and any other harmful effects. Equipment stored under tarpaulins or plastic covers **will not** be considered as meeting this requirement.
- B. The installation of electrical equipment shall not begin until the structure, if required, within which the equipment is to be permanently housed, is complete enough to provide protection from weather and vandalism (i.e. roof and doors installed).
- C. The Contractor will be responsible for ensuring conformance with these procedures.

3.02 EQUIPMENT MOUNTING

- A. Electrical Contractor shall be responsible for furnishing and setting all anchor bolts required to install Contractor's equipment.
- B. Where concrete mounting pads are required for equipment mounting, Electrical Contractor shall furnish all concrete and form work necessary to complete the installation.
- C. Where electrical equipment is located on damp or wet walls or locations as directed, it shall be "stand-off" mounted $\frac{1}{2}$ " from wall in a manner so that rear of equipment is freely exposed to surrounding air. Method of mounting shall be approved by Owner's representative before equipment is mounted.
- D. Enclosures for panelboards, switches or overcurrent devices shall not be used as junction boxes, auxiliary gutters or raceways for conductors feeding through or tapping-off to other switches or overcurrent devices, unless adequate space for this purpose is provided and the equipment is listed for this use.
- E. In order to maintain NEC ratings and classifications of cables, do not combine conduit contents or modify conduit materials of construction unless specifically directed or shown otherwise on project documents.

END OF SECTION 16010

DIVISION 16 - ELECTRICAL
Section 16111 - Conduit and Raceway

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is conduits, raceways and fittings required for operation and maintenance of facility.

1.02 RELATED SECTIONS

- A. Division 11 - Equipment
- B. Division 13 - Special Construction
- C. Division 15 - Mechanical
- D. Section 16010 - General Electrical Requirements
- E. Section 16123 - Building Wire and Cable
- F. Section 16190 - Supporting Devices

1.03 REFERENCE TO STANDARDS

- A. Federal Specifications WW-C-581d
- B. Federal Specifications WW-C-540c
- C. Federal Specifications WC-1094-A
- D. ANSI C80.1
- E. ANSI C80.5
- F. UL Standard UL-6
- G. NEMA RN1-1980
- H. NFPA 70 (NEC)
- I. NEMA TC-2
- J. NEMA TC-3
- K. NEMA TC-7
- L. UL-651
- M. A.A.S.H.T.O.
- N. ASTM A615

1.04 DELIVERY, STORAGE AND HANDLING

- A. Conduits shall not be shipped loose, but shall be bundled by sizes. Threads of metal conduits shall be protected by plastic caps. Fittings shall be stored in boxes. All equipment shall be stored on pallets to prevent contact with earth and shall be covered with plastic sheeting to protect them from dirt and weather.

1.05 SUBMITTALS (submit only on types applicable for project)

- A. Submit under provisions of Section 01300.
- B. Schedule 40 Galvanized Rigid Steel Conduit
- C. Schedule 40 Aluminum Rigid Conduit
- D. Schedule 40 and/or Schedule 80 PVC Conduit
- E. Liquid Tight Flexible Metal Conduit
- F. Explosion-proof Flexible Conduit

- G. Flexible Metal Conduit
- H. PVC Coated Galvanized Rigid Steel Conduit
- I. Expansion/Deflection Fittings

1.06 QUALIFICATIONS

- A. All material shall be purchased new from suppliers/manufacturers regularly engaged in the business of electrical conduit, ducts and fittings.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Schedule 40 Galvanized Rigid Steel Conduit:

Conduit shall be of heavy wall type fabricated from mild steel tubing and shall have a hot-dipped galvanized inner and outer coating, with a final coating of zinc chromate.

- B. Schedule 40 Rigid Aluminum Conduit

Conduit shall be of 6063 aluminum alloy, T-1 temper (Former designation T-42).

Aluminum IMC or EMT will not be allowed.

- C. PVC Conduit:

Conduit shall be Schedule 40 or Schedule 80, as noted on the drawings, PVC, 90°C, UL rated or approved equivalent. Material shall comply to NEMA Specification TC-2 (Conduit), TC-3 (Fittings-UL-514), and UL-651 (Standard for rigid nonmetallic conduit). Conduit and fittings shall carry a UL label (on each 10 foot length of conduit and stamped or molded on every fitting). Conduit and fittings shall be identified for type and manufacturer and shall be traceable to location of plant and date manufactured. Markings shall be legible and permanent. Conduit shall be made from polyvinyl chloride C-300 compound which includes inert modifiers to improve weatherability, heat distortion. Clean rework material, generated by manufacturer's own conduit production, may be used by same manufacturer, provided end products meet requirements of this specification. Conduit and fittings shall be homogeneous plastic material free from visible cracks, holes, or foreign inclusions. Conduit bore shall be smooth and free of blisters, nicks or other imperfections which could mar conductors or cables. Conduit, fittings and cement shall be produced by same manufacturer to assure system integrity and shall be Carlon Plus 40, Plus 80, or equal.

D. Liquid Tight Flexible Conduit (Non-Explosion Proof):

Liquid tight flexible metal conduit shall consist of polyvinyl jacket over flexible hot dip galvanized steel tubing. Flexible conduit shall be completely sealed from liquids, dust, dirt and fumes, be resistant to oil, gasoline, grease and abrasion. Jacket shall also be sunlight resistant. Flexible conduit shall be U.L. listed and comply with Article 351 of NEC. Flexible conduit shall be Flexi-Guard Type UAG, as manufactured by O-Z/Gedney, or equal.

E. Flexible Conduit (Explosion Proof):

Flexible conduit used in hazardous areas shall be suitable for use in Class I, Div. I, Group D areas and shall comply with all requirements of Articles 500 and 501 of the NEC. Flexible conduits shall be constructed from all Stainless Steel braided construction over woven cotton braid impregnated with asphalt. Conduit shall also be liquid tight for wet locations. Conduit shall provide a continuous electrical grounding path. Explosion proof flexible conduit shall be Crouse-Hinds ECGJH#####-S516 or ECLK#####-S516 Series, or equivalent.

F. PVC Coated Galvanized Rigid Steel Conduit:

If used, PVC coated galvanized rigid steel conduit shall be Robroy Industries Plasti-Bond, or equivalent. PVC coating shall be minimum of 40 Mils permanently fused to hot-dipped galvanized rigid steel conduit. A urethane inner coating shall be applied to the conduit interior and a clear urethane coating shall be applied over the galvanized threads.

G. Miscellaneous Fittings:

Fittings shall be suitable for use with conduits supplied. Mounting hardware shall be corrosion resistant, stainless steel, or equivalent.

H. Lay-In Raceways:

Unless otherwise indicated on the drawings, lay-in wireway installed in dry (non-hosedown) interior areas shall be NEMA 1 hinge cover steel enclosed wiring trough. Lay-in wireway installed outdoors or in interior areas subject to hosedown or wet conditions shall be NEMA 3R, 4 or 4X as noted on the drawings. Wireway shall be sized as shown on drawings, as a minimum, or as required by NEC, and shall be as manufactured by Square D, Hoffman, or equivalent. Install all hinged wireways with hinge on bottom.

J. Pull Strings

Each empty conduit shown or described on the drawings shall be furnished with a pull string to facilitate future conductor installation. String shall consist of non-deteriorating, non-metallic, non-cotton construction such as polyester or nylon material. Minimum tensile strength of all pull strings shall be 200#. Leave minimum of 12 inches slack at each termination or end. Any references on project drawings to "pull wire" shall be interpreted as a pull string as described

herein.

2.02 SEALING

A. Fire Seal (Fire Stopping Material):

1. Fire stopping materials shall consist of commercially manufactured products capable of passing ASTM E-814 (UL 1479) Standard Method of Fire Test for Through Penetration Fire Stops.
2. Fire stopping materials shall maintain the rating of the wall, partition, ceiling or floor opening that penetration is made. Comply with NEC 300-21.
3. Fire stopping materials shall be U.L. classified.
4. Use heavy wall steel pipe sleeves, anchored to building construction and finished plumb with wall, ceiling, or floor lines.
5. Manufacturers:
 - a. Chase Technology - CTC, PR-855.
 - b. Dow Corning - Silicone RTV Foam 3-6548.
 - c. Nelson - Flameseal.
 - d. Thomas & Betts - Flame Safe.
 - e. 3M - Fire Barrier.
6. Where applicable for the respective wall and its fire rating, smoke and fire stop fittings may be used in lieu of sealant as manufactured by OZ/Gedney, Series CFS.

B. Thermal Seal:

1. Seal penetrations of thermally insulated equipment or rooms to prevent heat transfer.

C. Water Seal:

1. Seal penetrations of perimeter walls or floors below grade to prevent entry of water. Use materials compatible with wall or floor construction and approved by Engineer. Use premanufactured fittings.
2. Seal penetrations of roof with flashings compatible with roof design and approved by Roofing System Manufacturer and Engineer.
3. Seal annular space between conductors and conduit wall of all conduit terminations where conduit exits from below grade in order to block moisture migration into electrical equipment. Install product only after conductors have been installed, terminated and commissioned for service. Conduit moisture barrier material shall not harden and be compatible with both wire insulation and conduit materials. Installed

product shall be easily removed for maintenance or modifications, regardless of the length of time material has been installed. Conduit moisture seal material shall be:

- a. WaterGuard Industrial Encapsulant
Advance Technology Products
14123 I-10 East Freeway
Houston, Texas 77015
Phone: (713) 450-5990
Fax: (713) 450-5980
- b. American Polywater Corporation
Polywater Duct Sealant FST-180 Series
P.O. Box 53
Stillwater, MN 55082
Phone: (651) 430-2270
Fax: (651) 430-3634

D. Explosion Proof Conduit Seals

1. Explosion proof conduit seals shall be suitable for use in Class I, Division 1, Group D hazardous location. Explosion proof conduit seals shall be Crouse-Hinds EYS or EZS Series, Appleton EYS, ESU, or EY Series, Killark ENY, EYS or EY Series, or O-Z Gedney EYA, EY, EZS Series explosion proof sealing fitting.

PART 3 EXECUTION

3.01 INSPECTION

- A. All conduits shall be inspected for proper fit and finish, for out-of-round and for proper thickness. All burrs and flashing shall be removed. Conduit and fittings shall be clean and free of obstructions.

3.02 INSTALLATION

- A. Minimum conduit size shall be 3/4" in diameter. Larger sizes shall be installed where noted or where required by NEC.
- B. All exterior above grade conduit shall be rigid aluminum type, except where noted otherwise. All below grade conduit shall conform to requirements of Section 16118 - Duct Bank.
- C. All conduits for signal cables (4-20 madc, telephone, radio communications antenna, etc.), whether exterior or interior, concealed or exposed, shall be galvanized rigid steel to minimize electromagnetic affects on this wiring.
- D. Exposed interior conduit shall be rigid aluminum type, except where noted otherwise on the drawings.

- E. Conduit runs embedded in structure floors may be Schedule 40 PVC or PVC coated galvanized rigid steel, except where noted on drawings, specified, or directed by the Owner's authorized representative.
- F. Where metal conduit is embedded in concrete, it shall receive one coat, 8 dry mils, Coal Tar Epoxy, or equal. Include any primer coats as may be required. Apply coatings in conformance with manufacturer's directions and recommendations. At the Contractor's option, PVC coated galvanized rigid steel conduit may be used in lieu of tar coating.
- G. All work shall be laid out with sleeves for openings through floors and walls, etc. as required prior to laying of floors and walls. If sleeves and inserts are not properly installed, Contractor will be required to do all necessary cutting and patching later at his own expense and to satisfaction of Owner's representative.

H. Sealing and Fireproofing

1. Sleeves:

- a. Install rigid metallic sleeves where exposed raceways pass through floors, walls (except exterior walls below grade) and ceilings.
- b. Sleeve Diameter: Size sleeves to accommodate their through penetrating items and allow a minimum of a one (1") inch void between the sleeve and the item of penetration.
- c. Extend sleeves 3-inches above floors or ceilings, and flush with each side of walls.

2. Seal openings in fire rated floors, ceilings and roofs:

- a. Pack void with backing material and ends of the sleeve sealed with a minimum of one (1") inch of a listed fire-resistive silicone compound to a depth required to meet the fire rating of the structure penetrated.
- b. Install firestopping to meet the requirements of ASTM E-814
- c. Install product in accordance with the manufacturer's instructions.

3. Non-Rated Surfaces

- a. Use galvanized sheet metal sleeves in hollow wall penetrations to provide a backing for sealant. For masonry construction, grout area around sleeve.
- b. Install escutcheons or floor/ceiling plates for penetrations through non-fire rated surfaces in rooms with finished ceilings and the penetration occurs below the ceiling.
- c. In exterior wall openings below grade, assemble rubber links of mechanical seal to the proper size for the pipe and tighten in place, in accordance with the manufacturer's instructions.
- d. Seal penetrations through interior partitions of rooms where room pressure or odor transmission must be controlled. Apply sealant to both sides of the penetration in such a manner that the annular space between the pipe sleeve and the pipe is completely filled.

- I. Conduit size and fill requirements shall comply with appropriate conduit fill tables

in Annex C of NEC. It should be noted these are minimum requirements and larger conduit sizes or smaller fill requirements shall be used whenever specified or detailed on drawings.

- J. Flexible conduit shall be provided as a connection between each motor junction box (or any other piece of equipment subject to movement or vibration) and rigid conduit system. Liquid-tight and explosion-proof flexible conduit shall not exceed 3' in length.
- K. Ream conduits only after threads are cut. Cut joints square to butt solidly into couplings. Where necessary to join two pieces of conduit and it is impossible to use standard coupling, use three piece conduit coupling. Use of running thread is prohibited. This applies to all rigid conduit installations, underground or otherwise. All field threaded rigid steel conduit shall have field threads re-coated using an electrically conductive, corrosion-resistant compound.
- L. Make all joints in underground conduit watertight with approved joint compound. Temporarily plug conduit openings to exclude water, concrete or any foreign materials during construction. Clean conduit runs before pulling in conductors.
- M. Hickey bends will not be acceptable for conduits one inch (1") and larger. Use manufactured elbows or bends fabricated with bending machine. Field bending of all PVC conduit shall be accomplished with use of equipment approved by conduit manufacturer. Open flame bending equipment will not be acceptable.
- N. A run of conduit between outlet and outlet, between fitting and fitting or between outlet and fitting shall not contain more than the equivalent of four quarter turn bends, including bends immediately at an outlet or fitting.
- O. Where conduit enters a box or fitting, provide a locknut and an insulated bushing. Use this method to terminate conduit in panels, pull boxes, safety switches, etc.
- P. Do not run conduit below or adjacent to water piping, except where permitted by Owner's representative.
- Q. Run exposed conduits parallel with walls and at right angles to building lines, not diagonally. Make bends and turns with pull boxes or conduit bodies.
- R. Support exposed Schedule 40 PVC conduit runs on walls or ceiling every three feet (3') and support exposed rigid metal conduit runs on walls or ceiling every five feet (5') with stainless steel or PVC coated galvanized cast one hole straps, clamp backs and anchors. Provide lead shield insert anchors, with stainless steel round head machine screws, for concrete and brick construction. In wood construction, use stainless steel round head wood screws. Where steel members occur, drill and tap and use stainless steel round head machine screws.
- S. In brick construction, drill hole for insert near center of brick, not near edge or in mortar joint.

- T. Support two or more PVC exposed hanging parallel conduit runs every three feet (3') and support exposed rigid metal hanging parallel conduit runs every five feet (5') with trapeze hangers. Hanger assembly to consist of concrete inserts, threaded solid rod, washers, nuts and cross members nominally one and five-eighths inch (1-5/8") by one and five-eighths inch (1-5/8") non-metallic framing, as specified in Section 16190 - Supporting Devices. Anchor each conduit individually to cross members of every other hanger with cast one hole straps, clamps backs and proper sized stainless steel or non-metallic machine bolts and nuts.
- U. Perforated iron strapping is prohibited. Set screw type fittings are prohibited.
- V. Use only screws, bolts, washers, etc. fabricated from rust resisting metals for supporting of boxes.
- W. Provide expansion/deflection fittings in all conduit runs which pass through or over building expansion joints.
- X. Schedule 40 PVC conduit shall be used for grounding electrode conductors.
- Y. All conduit installed in Class I, Div. 1 or 2, Group D shall be suitable for installation in the respective hazardous areas.
- Z. Install explosion-proof conduit sealing fittings in conformance with the manufacturer's instructions. Per Article 501 Paragraph 501-5(c)(6) of the NEC, cross-sectional area for conductors installed in a conduit sealing fitting shall not exceed 25%, unless conduit sealing fitting has been specifically approved for a higher percentage of fill.
- AA. PVC coated galvanized rigid steel conduit shall be installed per manufacturer's requirements, using tools specifically designed for installation of PVC coated galvanized rigid steel conduit. Tools and hardware which damage the coating in any way shall not be used with PVC coated galvanized rigid steel conduit. Any damage to PVC coated galvanized rigid steel conduit shall be immediately repaired to the satisfaction of the Owner's authorized representative using patching materials and methods per manufacturer's instructions. If, in the opinion of the Owner's authorized representative, PVC coated galvanized rigid steel conduit is damaged beyond repair, the damaged portion(s) shall be replaced at the contractor's expense.

END OF SECTION 16111

DIVISION 16 – ELECTRICAL
Section 16118 - Duct Bank

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is duct bank, concrete encasement, reinforcing, pre-cast or cast in place handholes, trenching and backfilling required for operation and maintenance of facility.

1.02 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement.
- B. Section 03300 - Cast-In-Place Concrete.
- C. Section 16010 - General Electrical Requirements.
- D. Section 16111 - Conduit and Raceway.
- E. Section 16123 - Building Wire and Cable.

1.03 REFERENCE TO STANDARDS

- A. Federal Specifications WW-C-581d
- B. ANSI C80.1
- C. UL Standard #6
- D. NEMA RN1-1980
- E. NEC (Chapter 9 Tables 4, 5, 5A, 8 and Appendix C)
- F. NEMA TC-2
- G. NEMA TC-3
- H. UL-651
- I. A.A.S.H.T.O.
- J. ASTM A615

1.04 DELIVERY, STORAGE AND HANDLING

- A. Reinforcing steel and conduit supports shall be stored on pallets, covered to protect them from weather.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Conduit Spacers / Supports.

1.06 MAINTENANCE SERVICE (WARRANTY)

- A. Material and workmanship shall be warranted to be free from defects in materials and workmanship for a period of one year from date of substantial completion established by Owner.

PART 2 PRODUCTS

2.01 CAST-IN-PLACE HANDHOLES (Where indicated on the drawings)

- A. Cast in place handholes shall comply with all applicable provisions of Section 03300 - Cast-In-Place Concrete of these Specifications. Handhole Frame and Lids shall be Neenah R-6662-#H (square) or R-6663-#H (rectangular) suitably sized to match project handhole dimensions, or equivalent. Handhole Lids shall be "T" hinged design. Logo "Electrical" shall be cast into lids at time of manufacture.
- B. Cable racks shall be provided per Section 16190 – Supporting Devices.

2.02. DUCT SPACERS / SUPPORTS

- A. Duct line spacers / supports shall provide stability and consistent separation and relieve direct stress for duct materials to be encased in concrete. Units shall incorporate a dovetail or other interlocking means to allow side-by-side interchangeability of conduit spacer sizes while maintaining horizontal stability. Units shall be of non-metallic construction and include integral base flanges and re-bar slots. Duct Spacers / Supports shall be Underground Devices "Wunpeece", Carlon/Lamson & Sessions Snap-Loc series or equivalent.

2.03 LINE MARKING TAPE (Where indicated on the drawings)

- A. If required, electrical line marking tape shall be installed at locations noted on the drawings. Tape shall be minimum 5 mils thick constructed of aluminum foil encased in an impervious Mylar plastic coating. The minimum tensile strength determined in accordance with ASTM D882 is 15,000 PSI. The tape shall contain sufficient metal mass to provide detectability at depths up to 3 feet with a radio type metal locator. Tape shall be acid, alkali and corrosion resistant. Color shall be "RED", corresponding to the standard color for electrical lines, and shall additionally be printed with "WARNING-ELECTRICAL LINE BELOW" or similar text. Line marking tape shall be as manufactured by Pro-Line Safety Products of West Chicago, Illinois or equivalent. Unless otherwise indicated on the drawings, burial depth of tape shall be approximately 18" below finish grade.

2.04 MISCELLANEOUS FITTINGS

- A. Fittings and conduit supports shall be suitable for use with conduits and ducts supplied.

PART 3 EXECUTION

3.01 DUCT BANK

A. Security

Contractor is responsible for providing all safety barricades, safety materials, man-lift devices, and posting safety watches at all manholes and raceway vaults as required in order to accomplish this project in a safe manner.

B. Concrete Encased Schedule 40 PVC

Concrete encased Schedule 40 PVC duct bank shall be installed for all below grade duct bank. Where applicable, all below grade conduit under paved surfaces receiving vehicular traffic shall be reinforced concrete encased Schedule 40 PVC. All other exterior below grade conduit shall be concrete encased Schedule 40 PVC, unless otherwise noted. Transition from below grade Schedule 40 PVC conduit to galvanized rigid steel conduit shall be as detailed on plans. All field threaded galvanized rigid steel conduit shall have field threads re-coated using an electrically conductive, corrosion-resistant compound.

C. Excavation for Duct Bank

The ground shall be excavated in open trenches to width, depth and in direction necessary for proper installation of underground duct work and any manholes, handholes, etc., and connections as may be shown on plans.

Any necessary sheathing to prevent cave-ins, etc. shall be provided by this Contractor.

Where muck or unstable ground is encountered in bottom of trench, it shall be excavated to a depth of at least 12 inches below line of duct or slab. Where bottom of trench is excavated below necessary elevation, it shall be brought to proper grade by use of torpedo sand or three-eighth inch (3/8") gravel, well compacted.

Where excavation for its entire depth is in water or wet sand, Contractor shall install a pumping system connected with well points so as to drain same effectively.

Excavations shall be deeper than minimum wherever required in order that ducts or conduits may be installed so as to avoid new or existing piping, etc., as directed by site conditions or Owner's representative.

Should conduits, ducts, etc. pass under sidewalks, roads, or curbs, Contractor shall take up same in order to install conduit or ducts. All sidewalks, roads or curbs shall be replaced with material equal to that removed and shall be as approved by Owner's representative.

CONTRACTOR SHALL PROCEED WITH CAUTION IN EXCAVATION AND PREPARATION OF TRENCH SO THAT EXACT LOCATION OF UNDERGROUND STRUCTURES, UTILITIES AND PIPING, BOTH KNOWN AND UNKNOWN, MAY BE DETERMINED, AND CONTRACTOR SHALL BE HELD RESPONSIBLE FOR REPAIR OF SUCH STRUCTURES, UTILITIES AND PIPING WHEN BROKEN OR OTHERWISE DAMAGED BY CONTRACTOR.

D. Installation of Duct Bank

All underground duct bank shall be a minimum of 1'-6" and a maximum of 2'-6" below finished grade to top of top duct in bank or as detailed in plans and/or specifications.

Extend concrete encasement for ductbank to all manholes and handholes. Unless otherwise indicated on the drawings, enter and exit all manholes and handholes utilizing PVC conduit with end bells.

Where possible, install conduit with minimum pitch of 4 inches per 100 ft length.

Where duct comprised of plastic (PVC) conduit must transition from underground to above ground, conduits shall transition from PVC conduit to rigid steel conduit by means of factory manufactured couplings. All transitions from plastic (PVC) conduit to galvanized rigid steel conduit shall be made within concrete encasement as detailed on drawings.

In locations where galvanized rigid steel conduit is specifically noted to enter or exit manholes or handholes provide grounding bushings and install bonding jumpers at ends of all conduits. Should transition be required between PVC conduit and exposed rigid steel conduit, provide factory manufactured couplings and install transition within concrete encasement.

All duct runs shall be separated and supported (before backfilling or pouring concrete) on precast concrete or preformed PVC spacers. Conduit spacing shall be minimum of 7-1/2" center-to-center.

All angle bends in conduit of 45° or greater shall be made with PVC-coated rigid galvanized steel conduit. Provide factory manufactured couplings between conduit types.

Materials for concreting shall be thoroughly mixed and immediately placed in trench around rigid conduits and ducts. No concrete that has been allowed to partially set shall be used. After duct runs are completed and concrete is set, Contractor shall backfill trenches and tamp thoroughly so as to settle the fill.

Before Contractor pulls any cables into ducts he shall have a mandrel one-fourth inch (1/4") smaller than duct inside diameter and approximately twenty inches (20") long pulled through each duct, and if any concrete or obstructions are found, Contractor shall remove them and clear ducts.

E. Duct Bank Under Traveled Surfaces and Pipe Intersections

Unless otherwise detailed on project drawings, all duct runs passing under roadways, traveled surfaces, or where ductbank intersects or crosses underground piping utilities shall be Schedule 40 PVC conduit encased on all sides with a two inch (2") concrete envelope and reinforced as specified herein.

Reinforcing shall consist of one-half inch (1/2") round bars spaced six inches (6") on center, paralleling ducts on top, bottom and sides, with one-half inch (1/2") formed tie bars spaced twelve inches (12") on centers. Bars shall overlap forty (40) diameters and shall extend five feet (5') beyond roads or drives on each side.

F. Concreting and Forms

All concreting and form work necessary in connection with construction and concreting around plastic and metal duct runs underground shall be provided by this Contractor.

G. Ready-Mixed Concrete

Ready-mixed concrete shall be used for all duct runs to be encased. Ready-mixed concrete shall comply with requirements set forth in "Standard Specifications for Ready-Mixed Concrete," (ASTM Designation C-94).

H. Removal of Water

New construction:

Contractor shall at all times during construction provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering excavations or other parts of work and shall keep said excavations dry until all work to be performed therein has been completed.

Existing facilities:

Where project requirements involve existing ductbank, manholes and handholes, Contractor should assume same is full of water and pumping will be required. Furnishing of all pumping equipment and labor in order to work on existing system shall be considered the responsibility of the Contractor and incidental to the project cost.

I. Backfill in Open Areas

Backfill for conduit and duct runs in continuous open areas away from roadways, paved areas and structures shall be backfilled as described below.

Unless otherwise noted, clean material obtained from the excavation which, in opinion of Owner's representative, does not contain excessive moisture, shall be suitable in constructing backfill. Excavated material which is considered unsuitable by Owner's representative due to excessive moisture may be allowed to dry before being used as backfill. Approved backfill material shall be placed in 6 to 8 inch layers and then compacted to a minimum of 90% Standard Proctor

density or that necessary to prevent settlement. Backfill shall be placed to a plane four (4) inches above finished grade and then excavated to grade according to plans and specifications.

J. Backfill Under Roadways and Paved Areas

Unless otherwise ordered by Owner's representative, selected granular backfill shall be used in locations where conduit and duct runs cross roadways and paved surfaces. Granular backfill shall be used from top of concrete encasement to bottom of roadway base and shall be compacted to 95% Standard Proctor of material to be used, as tested. Material for selected granular backfill shall be CA-6.

K. Pavement Restoration

If duct bank installation requires pavement removal, pavement shall be saw cut prior to removal. As directed by the Owner's authorized representative, pavement removed shall be replaced with concrete pavement or bituminous concrete surface material (Class I, minimum of 1700 pound Marshall stability) and compacted to satisfaction of Owner's representative.

L. Sidewalk Restoration:

If duct bank installation requires sidewalk removal, pavement shall be saw cut at a concrete joint (min 2 feet from excavated area of duct bank). As directed by the Owner's authorized representative, sidewalk shall be removed and replaced with Ready-Mix Concrete (as specified above) at a thickness to match existing. Sub-base shall be compacted prior to pouring.

M. Jacking Conduit

With approval of Owner's representative, Contractor shall be permitted to jack conduit under roadways and sidewalks.

3.02 CAST-IN-PLACE HANDHOLES (Where indicated on the drawings)

A. Handholes shall be located on undisturbed earth or fill material compacted to 90% Standard Proctor. Locations shall be over-excavated to allow installation of compacted CA-2 aggregate placed in a manner to provide a level base for manhole.

B. Handholes shall be constructed as detailed on plans. Cables and wiring in handholes shall be tie-wrapped using non-metallic, non-abrasive ties.

3.03 SEPARATION OF CABLES IN HANDHOLES (WHERE INSTALLED)

A. Contractor shall maintain maximum separation possible of telephone cables and 4-20 mdc signal cables from 120V, 208V and 480V wiring in handholes to minimize electromagnetic affects from this wiring.

3.04 WIRE AND CABLE INSTALLATION

- A. All wire and cable passing thru manholes, handholes or vaults shall be supported on non-metallic racks or supports. No wire or cable will be permitted to lay directly on the floor of manholes, handholes or vaults.

END OF SECTION 16118

DIVISION16 – ELECTRICAL
Section 16123 - Building Wire and Cable

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply of wire and cable to provide a complete and operational electrical system.
- B. Unless otherwise specified or detailed on drawings, all wire and cable on this project shall be copper construction only.

1.02 RELATED SECTIONS

- A. Division 11 - Equipment
- B. Division 13 - Special Construction
- C. Division 15 - Mechanical
- D. Section 16010 - General Electrical Requirements
- E. Section 16111 - Conduit and Raceway
- F. Section 16170 - Grounding and Bonding

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code
- B. U.L Standard No. 44 - Thermoset-Insulated Wires and Cables.
- C. IPCEA Publication No. S-66-524.
- D. Federal Specification J-C-30B
- E. ASTM Specification B-8.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Wire and cable shall be delivered on reels or coiled in boxes. Wire and cables shall be stored and handled to prevent damage to conductor and insulation.

1.05 SUBMITTAL REQUIREMENTS

- A. Submit under provisions of Section 01300.
- B. Contractor shall submit for all cable types and sizes used on this project.

1.06 QUALIFICATIONS

- A. Wire and cable shall be manufactured and supplied by a company regularly engaged in business of furnishing wire and cable. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of wire and cable.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and

workmanship for period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

A. RHW-2 / USE-2 WIRE

Unless otherwise noted on the drawings or specifications, any cable which is to be installed below grade (underground) under this project shall be dual-rated type RHW-2 & USE-2. Contractor should note that this applies to both direct buried cable and cable in conduit or duct.

Cable shall be 600 Volt rated, type RHW-2 & USE-2 sized as indicated on the drawings. Cable shall comply with Underwriters Laboratories Standard U.L. 44 (for Type RHW-2) and U.L. 854 (for Type USE-2) and shall pass the IEEE 383, 70,000 BTU/hr and VW-1 Flame Tests. Cables shall be rated for use at 90°C in both wet and dry locations and be suitable for use in conduit, underground service entrance cable and direct burial applications.

B. THHN/THWN

Unless otherwise noted on the plans or specifications, all interior power wiring installed under this project shall be type THWN.

Cable shall be 600 Volt rated, type THHN/THWN sized as indicated on the drawings. Cable shall comply with Underwriters Laboratories Standard U.L. 83. Cables shall be rated 90°C in dry locations 75°C in wet locations.

C. INSTRUMENTATION SHIELDED CABLE (For use in Conduit)

Shielded instrumentation cable shall be used where required or shown on plans. Cable construction shall be #16 AWG tinned copper, polyethylene insulated, have #18 AWG stranded tinned copper drain wire and aluminum-polyester shield with 100% coverage. Overall jacket shall be polyvinyl Chloride (PVC). Cables shall be 60°C, 600 V rated and U.L. recognized.

1. 2-Conductor shielded instrumentation cable for use in conduit shall be Belden #8719, or equivalent.
2. 3-Conductor shielded instrumentation cable for use in conduit shall be Belden #8618, or equivalent.

2.02 COLOR CODING

- #### A.
- Color code conductor insulation for #10 AWG or smaller conductors. Color code conductors #8 AWG or larger with colored tape or colored insulation. Standard colors:

	120/240V 1 Phase <u>3W</u>	240 V or 208/120V 3 Phase <u>3 or 4W</u>	480V 3 Phase <u>3 or 4W</u>	240/120V 3 Phase <u>4W,)</u>
Phase A	Black	Black	Brown	Black
Phase B	Red	Red	Orange	Orange (high leg)
Phase C	N/A	Blue	Yellow	Blue
Neutral	White	White	Gray	White
Ground	Green	Green	Green	Green

- B. Intrinsically safe wiring shall be light blue color insulation per ANSI/ISA RP12.6 and NEC 504 or per respective equipment manufacturer's recommendations.
- C. Control wiring insulation color shall be red.
- D. 120 VAC control wiring from a separate source (for example, 120 V control wiring from a control panel that supplies a remote located starter) shall be with yellow color insulation.

2.03 WIRE PULLING LUBRICANT

- A. Pulling lubricant shall be UL listed, water based, polymer solution. Lubricants containing waxes, soaps or combustible materials are not acceptable. Contractor shall verify the compatibility of the selected cable pulling lubricant and cable jacket materials proposed. Manufacturers/Lubricants shall be as follows, or equivalent:
 1. American Polywater - Polywater J
 2. Ideal Industries - ClearGlide
 3. American Colloid - Poly-X
 4. Buchanan - Quick Slip
 5. ARNCO – HydraLube

2.04 SPLICES AND JOINTS

- A. Splices and joints shall be as described below, or approved equivalent.
- B. Above grade:
 1. #8 and smaller conductors:
 - a. Ideal "wing nut" type insulated connectors.
 - b. Scotchlok R, B, and Y type insulated connectors.
 - c. Thomas and Betts, PT-1, PT-2 and PT-3 insulated connectors.
 2. #6 and larger conductors:
 - a. New construction: For straight line connections, use compression connector with rubber shrink type insulating cover or boot.
 - b. New construction: For "Tee" cable taps, use compression

connector with rubber shrink type insulating cover or boot.

- c. Existing constructon: For taps in cabinets, gutters and other close locations, use O-Z/Gedney type XW & XWC, XTP & XTPC or, PMX & PMXC, or equivalent.
- C. Below grade splices in manholes, handholes and vaults **will not** be allowed on this project. Conductors are to be pulled continuous end-to-end unless otherwise noted or directed by the Engineer in writing. Where specifically directed, the following shall be utilized:
- 1. #8 and smaller conductors:
 - a. Buchanan "B-Cap Twist and Seal" (filled-type) water resistant insulated connectors, or equivalent.
 - 2. #6 and larger conductors:
 - a. Conductors shall be spliced with either exothermic weld or compression-type connectors with cast resin insulation, Scotchcast 82A or 85 Series, or equivalent. Set screw fittings will not be accepted. Heat-shrink or cold-shrink insulation units below grade are not acceptable.
- D. All splices of direct buried conductors - of any size - shall be molded in-line cast resin splice, Scotchcast 82A or 85 Series, or equivalent. Conductors shall be spliced with either exothermic weld or compression-type connectors. Set screw fittings will not be accepted. Heat-shrink or cold-shrink insulation units below grade are not acceptable.

2.05 LINE MARKING TAPE

- A. Where required or noted on the drawings, line marking tape shall be installed as specified in Section 16118 - Duct Bank.

PART 3 EXECUTION

3.01 INSTALLATION (Wire Conductors)

- A. Wire and cable shall be installed using accepted industry methods to prevent damage to conductors and insulation. Installation shall comply with all applicable sections of NEC regarding conduit fill.
- B. No splices shall be permitted in conduit bodies. All splices shall be made in junction boxes, control panels and cabinets provided for that purpose as detailed or required by need.
- C. Neatly train and lace wiring inside boxes, equipment and panelboards.
- D. Drawings are diagramatic in showing circuitry routing between devices and equipment. Provide all phase conductors, neutrals, switched and unswitched

legs, grounds, etc., as required for a complete and operational electrical system.

- E. All 120V circuits shall have individual neutral conductors. 120V circuits with “shared” neutral conductor shall not be permitted.
- F. Minimum wire size shall be #12 unless otherwise noted. Where protected by 15A fuses, control wiring may be #14 AWG.
- G. All conductors shall be continuous without splices except at locations approved for the purposes of splicing.
- H. All wire sizes shall be stranded except where specifically approved otherwise.
- I. Intrinsically safe wiring shall be separated from non-intrinsically safe wiring in compliance with Article 504 of the NEC and ANSI/ISA Standard RP12.6. Intrinsically safe wiring insulation color shall be blue.
- J. All circuits shall be labeled in compliance with Section 16195 - Electrical Identification.
- K. Pulling eyes on conductors or a basket weave grip shall be used for pulling cable. Woven wire cable grips shall be used to pull all single conductor cable where pulling eyes are not available. Preferred method for pulling conductors is factory-installed eyes attached to conductors. All sharp points and edges on the hardware attaching the pulling rope to the cable shall be taped to prevent snagging or damaging the raceway.
- L. When a cable grip or pulling eye is used for pulling, the area of the cable covered by the grip or seal plus 6 inches shall be cut off, and discarded when the pull is completed. When pulling loops are used, the entire loop shall be cut off and discarded when the pull is completed.
- M. A non-binding type of swivel, or swivel connection shall be inserted between the pulling rope and the cable pulling eye, grip or loop to prevent twisting under strain and allow for free rotation of the cable during pulling.
- N. The pulling tension of any cable shall not exceed the maximum tension recommended by the cable manufacturer. Pulling mechanisms of both the manual and power types shall have the rated capacity clearly marked on the equipment. Break-away shear-pins or other acceptable method of tension limitation shall be utilized on pulling equipment to prevent over-stressing cable during installation. To avoid insulation damage from excessive sidewall pressure at bends, the pulling tension, in pounds at a bend, shall not exceed 300 times the radius of the bend in feet.
- O. As soon as the cable is pulled into place, the pulling eyes, cable grips, or pulling loops shall be removed. On exterior pulls, the remaining cable ends shall be temporarily resealed with either a minimum of three (3) wraps of 2" Scotch #23 rubber splicing tape or heat-shrink caps. Exposed cable ends shall be wrapped in such a manner to prevent unintentional water entry. Cable ends or seals shall be installed prior to the end of the workday.

- P. Cable shall not be bent to a radius of less than 4 times the overall diameter, including installation apparatus.
- Q. Cable supports and securing devices shall be installed to provide adequate support without deformation of the cable jackets or insulation.
- R. Cables shall be routed within manholes and vaults such that adequate working space is provided within the structure for cable splicing and for the installation of future cables.
- S. All damaged cable shall be removed and replaced at no additional expense to the project.

3.02 CONNECTIONS AND TERMINATIONS (Wire Conductors)

- A. Identify each conductor in panelboards, junction or pull boxes, or troughs with a permanent pressure sensitive label with suitable numbers or letters for easy recognition. Identify control wiring at each end and in junction boxes with numeric wire number corresponding to control wiring diagram.
- B. Thoroughly clean wire before installing lugs and connectors.
- C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- D. Terminate spare conductors with electrical tape, identify as "spares" and roll up in box.

3.03 TESTING (Wire Conductors)

- A. Inspect wiring for physical damage and proper connection.
- B. All wire and cable shall be tested for continuity and short circuits prior to energizing circuits. Verify proper phasing, adjust as required.
- C. Comply with all applicable items in Section 16010 and 16950.

END OF SECTION 16123

DIVISION 16 - ELECTRICAL
Section 16130 - Boxes

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply and installation of all junction and pull boxes to provide a complete and operational electrical system.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceways
- C. Section 16123 - Building Wire and Cable
- D. Section 16170 - Grounding and Bonding
- E. Section 16190 - Supporting Devices

1.03 REFERENCE TO STANDARDS

- A. NEMA 12
- B. NEMA 4
- C. NEMA 4X
- D. NEMA 3R
- E. NEMA 7
- F. U.L. 50 - Enclosures for Electrical Equipment
- G. ANSI/NEMA OS-1 - Sheet Steel Outlet boxes, Device Boxes, Covers and Box Supports
- H. NEMA 250 - Enclosures for Electrical Equipment

1.04 DELIVERY, STORAGE AND HANDLING

- A. Junction and pull boxes shall not be shipped loose, but shall be in boxes with labels indicating size and type. These boxes shall be stored away from contact with earth and protected from weather and abuse.

1.05 SUBMITTAL REQUIREMENTS

- A. Submit under provisions of Section 01300
- B. Junction and pull boxes.

1.06 QUALIFICATIONS

- A. Junction and pull boxes shall be manufactured and supplied by a company regularly engaged in business of furnishing junction and pull boxes. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of junction and pull boxes. Junction and pull boxes shall be U.L. listed.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Dimensions of all boxes shall meet or exceed NEC Article 370 requirements. Boxes larger than 12 inches in any dimension shall be hinged type.
- B. Flush mounted exterior boxes in floors, walkways and walls shall be NEMA 4, cast aluminum, Crouse Hinds, Killark, or equal. For supplemental corrosion protection, boxes encased in poured concrete shall have an asphalt paint coating applied to surfaces in contact with concrete prior to installation. Note that an asphalt paint coating is not required on boxes installed in masonry brick or block walls.
- C. Surface mounted interior junction and pull boxes used with Schedule 40 PVC conduit shall be nonmetallic and shall be as manufactured by Carlon, or equal.
- D. Surface mounted interior junction and pull boxes used with GRS or EMT conduit shall be NEMA OS-1, stamped galvanized steel.
- E. Flush mounted interior boxes in concrete floors and concrete walls shall be NEMA 4, cast aluminum, Crouse Hinds, Killark, or equal, and shall be supplied with asphalt paint applied to all surfaces in contact with concrete.
- F. Boxes used to support light fixtures shall be of metallic construction and capable of supporting installed fixtures.
- G. Exterior junction and pull boxes located in non-hazardous, non-classified areas shall be NEMA 4X stainless steel or aluminum. Provide waterproof conduit hubs, Meyers or equivalent, for all conduit terminations at enclosures. Gasketed lock-nuts will not meet this requirement.
- H. Junction boxes located in classified hazardous areas (Class I, Division 1 or 2, Group D) and/or junction boxes detailed on the drawings with an EP (Explosion Proof rating) shall be NEMA 7 explosion proof U.L. listed suitable for use in Class I, Division 1, Group D hazardous locations. Exterior mounted NEMA 7 junction boxes shall also meet NEMA 4 requirements. All NEMA 7 explosion proof junction boxes shall be of aluminum material. All junction and pull boxes installed in Class I, Division 1 and Division 2 areas (hazardous) shall comply with the applicable provisions of the NEC Articles 500 and 501.
- I. Exterior junction and pull boxes for intrinsically safe wiring **ONLY** located in classified hazardous areas (Class I, Division 1 or 2, Group D) or non-hazardous areas shall be NEMA 4X and NEMA 13 stainless steel or aluminum.

- J. Acceptable manufacturers:
1. Appleton Electric Co.
 2. Crouse-Hinds Co.
 3. Hennessy Outdoor Enclosures.
 4. Hoffman Co.
 5. Hubbell-Killark Electric Mfg. Co.
 6. O.Z./Gedney Co.
 7. Square D.
 8. Hammond.
 9. Carlon

PART 3 EXECUTION

3.01 INSTALLATION

- A. Junction or pull boxes required by code or need which are not detailed on drawings shall be considered incidental to proposal price and will not be paid for separately.
- B. Any damage to equipment enclosures, pull or junction boxes shall be immediately repaired or replaced to satisfaction of Owner's representative.
- C. Junction and pull boxes containing intrinsically safe wiring shall be labeled "Intrinsically Safe".
- D. All pull or junction boxes surface mounted in any interior damp location shall be "standoff" mounted 1/2" from the wall in a manner to promote air circulation completely around the box.
- E. The contractor shall coordinate the installation of flush mounted junction boxes with the general and mechanical work as required at each structure.
- F. Flush mounted junction boxes to be installed in precast top slabs shall be furnished by the contractor for installation, and shall be furnished completely assembled, including conduit nipples and stubouts with ends covered by protective caps.
- G. Provide knockout closures to cap unused knockout holes where blanks have been removed (for non-hazardous location boxes).
- H. Explosion proof junction boxes requiring drilling and taping for conduits shall be U.L. listed to permit field drilling and taping or shall be drilled and tapped at the factory. Installations that void the U.L. listing, void the explosion proof rating, or void the warranty of a device shall **NOT** be permitted. Provide plugs (suitable for Class I, Division 1, Group D location and manufacturers requirements) to plug unused conduit entrances in explosion proof boxes.
- I. All mounting hardware shall be corrosion resistant.

- J. All metal junction boxes shall be bonded to ground with a ground wire connection.

END OF SECTION 16130

DIVISION 16 - ELECTRICAL
Section 16141 - Wiring Devices

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work in this section is supply and installation of receptacles and toggle switches.
- B. Work shall also include supply and installation of device boxes for receptacles and toggle switches.
- C. Work shall also include supply and installation of remote control pushbutton stations.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceway
- C. Section 16123 - Building Wire and Cable
- D. Section 16195 - Electrical Identification

1.03 REFERENCE TO STANDARDS

- A. UL Standard 943 Class A
- B. Federal Specification W-C-596F
- C. NEMA 3R
- D. NEC Article 410-57
- E. NEMA 4X
- F. NEMA 7
- G. NEMA WD-1
- H. NEMA WD-6
- I. ANSI/NEMA OS-1 - Sheet Steel Outlet boxes, Device Boxes, Covers and Box Supports
- J. U.L. 514A - Metallic Outlet Boxes

1.04 DELIVERY, STORAGE AND HANDLING

- A. Supplied items shall not be shipped loose but shall be in boxes, labeled with material and equipment enclosed. Boxes shall be stored away from contact with earth and shall be protected from weather.

1.05 SUBMITTAL REQUIREMENTS

- A. Submit under provisions of Section 01300
 - 1. Receptacles.
 - 2. Toggle switches.
 - 3. Weatherproof covers and device boxes.
 - 4. Remote control stations.
 - 5. Multi-outlet raceway (if used).

- B. Where applicable, color of wiring devices to be identified during submittal review.

1.06 QUALIFICATIONS

- A. Wiring devices shall be manufactured and supplied by companies regularly engaged in business of furnishing wiring devices. If required by Owner's representative, manufacturers shall submit certification to a minimum experience of five years in manufacture of respective wiring devices.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Receptacles:

Receptacles shall be installed under this item where shown on drawings.

- 1. General Purpose Receptacles

General purpose receptacles for all wall type convenience outlets in non-hazardous areas shall be of 20 amp, 125 volt, 3 wire grounding type, NEMA 5-20R, back and side wire compatible, heavy duty industrial specification grade.

- a. Leviton 5362A
- b. Pass & Seymour 5362-A
- c. Hubbell HBL5362
- d. Equivalent

- 2. Corrosion Resistant Receptacles

Where indicated on the drawings, corrosion resistant receptacles in non-hazardous areas shall be of 20 amp, 125 volt, 3 wire grounding type, NEMA 5-20R, back and side wire compatible, heavy duty industrial specification grade.

- a. Leviton 53CM62
- b. Equivalent

- 3. Ground Fault Circuit Interrupting (GFCI) Duplex Receptacles

Duplex receptacles with ground fault circuit interrupters (GFCI) shall be provided and installed where noted on drawings. Devices shall comply

with U.L. Standard 498 and meet or exceed 2003 requirements for U.L. Standard 943 for Class A Ground Fault Circuit Interrupters. All receptacles shall be rated 20 amp with NEMA 5-20R receptacle configuration. To simplify locating the proper “reset” button after tripping, unless specifically noted on project drawings, DO NOT utilize “feed-thru” feature to protect downstream GFCI outlets. Provide self-protected GFCI receptacles at each required location. Receptacles shall be back and side wire compatible, feed-thru type (whether or not feed-thru feature is utilized on project):

- a. Leviton “SmartLock” 8899
- b. Pass & Seymour 2094
- c. Hubbell GF-5362A
- d. Equivalent, meeting requirements noted.

4. Explosion Proof Receptacles (Where Required)

Hazardous area 120 VAC plugs and receptacles shall be suitable for use in a Class I, Division 1, Group D environment as well as damp areas. They shall be dead front delayed breaking type construction. Operation shall be by inserting plug and then rotating it to make the circuit and reverse to remove. In making or breaking the circuit any resulting electrical arc shall be confined in factory sealed chamber such that no external conduit seals are required. Receptacle shall utilize one piece molded gasket to seal cover plate and plug, when inserted, providing full environmental protection. Plug shall also fit standard NEMA 5 U-ground receptacles such that hazardous portable equipment may also be utilized in non-hazardous locations, however standard NEMA 5 U-ground plugs shall not be compatible with, nor work in receptacle in hazardous location. Field assembly shall be accomplished with standard tools only. Plug and receptacle shall both have a NEMA 15A rating. Receptacle shall have a spring loaded door to seal out environment when plug is not inserted. Housing, door and plug shall be composed of copper-free aluminum with corrosion resistant epoxy finish on receptacle. Plug and receptacle assemblies shall be as manufactured by Crouse-Hinds Ark-Gard 2 Series #ENR-21201-S602 and ENP5151, or equal.

6. Special Purpose Receptacles (Where Required)

Special purpose receptacles shall have amperage, voltage, number of poles, number of wires as required or as shown on drawings. Contractor shall verify compatibility between proposed special purpose receptacles and plugs of proposed equipment prior to ordering. Contractor shall also provide labels for special purpose receptacles.

B. Toggles Switches:

Toggle switches shall be installed under this item.

1. General Purpose Toggle Switches

Units for use in non-hazardous, toggle-type applications shall be 20A, 120/277 VAC rated, back and side wired type, industrial specification grade

a. Single Pole

Leviton 1221-2
Pass & Seymour 20AC1
Hubbell HBL1221
Equivalent

b. Two Pole

Leviton 1222-2
Pass & Seymour 20AC2
Hubbell HBL1222
Equivalent

c. Three-Way

Leviton 1223-2
Pass & Seymour 20AC3
Hubbell HBL1223
Equivalent

d. Four-Way

Leviton 1224-2
Pass & Seymour 20AC4
Hubbell HBL1224
Equivalent

e. Single-Pole; Double Throw; Center-Off

Leviton 1257
Pass & Seymour 1251
Hubbell HBL1557
Equivalent

2. Explosion-Proof Toggle Switches

Hazardous area 120 VAC toggle switches shall be suitable for use in a Class I, Division I, Group D environment. Toggle switches shall be "factory sealed" (such that no external conduit seals are required) snap switches, 20A rated at 120V and shall be Crouse-Hinds EDS series, or equivalent.

C. Unless noted otherwise on the drawings, wallplates shall be of nylon construction

for resistance to impact, abrasion and mechanical stress fracture. Wallplate color shall match receptacle or switch at each location.

D. Weatherproof Receptacle Covers:

All receptacle covers noted as "weatherproof" or installed outdoors shall comply with NEC Article 406.8B1. Units shall remain raintight whether or not a plug and cord is inserted. Covers shall be sunlight resistant, padlockable, polycarbonate construction as manufactured by Leviton, Taymac, Carlon, or equivalent.

E. Device Boxes:

1. Where PVC conduit is used, associated device boxes shall be of FS design, non-metallic PVC, as manufactured by Carlon, or equivalent.
2. Where galvanized rigid metal conduit is used, associated device boxes shall be FS or FD design, metallic, as manufactured by Crouse-Hinds, or equivalent.

F. CONTROL STATIONS

Pushbutton type control stations used to control motors, solenoids and selected lights and heaters, etc., shall be furnished and installed under this item and located where indicated on drawings.

1. General Purpose Control Stations (Non-Hazardous Locations)

Interior and exterior general purpose control stations shall be NEMA 4X rated, with NEMA 4X enclosures. Selector switches, pushbuttons and transformer type, push-to-test indicating lights shall be Square D Type SK, or equivalent.

2. Explosion Proof Control Stations

Control stations in hazardous areas shall be suitable for Class I, Division I and II, Group D (NEMA 7D) as well as NEMA 3, 4X and 12. Units shall be of non-metallic construction with an internal metal imbedded grounding grid. Enclosure openings shall be designed to accept 3/4" threaded rigid metal conduit. All external components shall be coated with epoxy, Teflon or Mylar or be constructed of corrosion proof material. Enclosure shall be gasketed to prevent entrance of moisture without interfering with venting of cooled hazardous gases and vapors. Enclosure shall exceed UL pull-out and bending resistance tests resulting in no effect on conduit connections. Stainless steel pushbutton shafts shall be utilized with stainless steel bushings for long life in corrosive atmospheres. Pushbutton and selector switch contacts shall be silver cadmium oxide sealed in interior chamber to assure resistance to corrosion. Springs shall be stainless steel.

Control stations shall be "factory sealed" (such that no external conduit

seals are required) and shall comply with UL Standard 698. Maintained stop stations shall be Appleton Electric N2D75 Series, or equivalent. Momentary start pushbutton stations with pilot light shall be Appleton Electric N2DC75 Series, or equivalent. If complete station of maintained stop, momentary start and pilot light are required, both units are to be utilized.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Unless otherwise specified on the drawings, use the following as a guide for mounting of device boxes and control operator (pushbutton) stations:

<u>Device</u>	<u>Height above finished floor to bottom of box</u>
1. Toggle wall switches	48 inches
2. Receptacles non-finished areas	48 inches
3. Control Operator (P.B.) Stations	48 inches

- B. Unless otherwise noted on the drawings, boxes for wiring devices shall be flush mount construction such that device cover plates are flush with wall after installation.
- C. Legend plates shall be securely attached using weatherproof adhesives in accordance with Section 16195.
- D. All receptacles and toggles switches shall be grounded with a ground conductor connected to their respective grounding terminal or screw.
- E. Grounded conductors (neutrals) shall be continuous between outlets, boxes, devices, and so forth per NEC Article 300.13. Wiring device neutral connections shall not be utilized as splice points. Neutral path shall not be broken with wiring devices removed from boxes.
- F. Test all receptacles, toggle switches and control stations for proper operation, including GFCI operation where applicable.
- G. Ground device enclosure or box with a ground conductor connected to the respective grounding lug or screw.
- H. Unless specifically shown otherwise on the drawings, all device boxes are to be flush mounted. This includes masonry construction.
- I. Where boxes are to be installed in finished masonry walls, adjust position of outlets to suit masonry course lines.
- J. Do not install boxes back-to-back in the same wall. Provide minimum 4 inches separation.

- K. Provide insulation behind boxes mounted in exterior walls.
- L. For boxes, outlets or multi-outlet raceway installed above counters or backsplashes, coordinate location and mounting height to agree with other trades and equipment.
- M. Unless otherwise specified, install wall switches with "OFF" position down.
- N. Unless otherwise specified, install duplex outlets with ground blade on the bottom if mounted vertically or to the right if mounted horizontally. Install GFCI receptacles in such that "Test" and "Reset" wording are oriented correctly.

END OF SECTION 16141

DIVISION 16 - ELECTRICAL
Section 16160 - Cabinets and Enclosures

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Enclosures used to house electrical equipment.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16170 - Grounding and Bonding
- C. Section 16190 - Supporting Devices
- D. Section 16195 - Electrical Identification
- E. Section 16902 - Electric Controls and Relays

1.03 REFERENCE TO STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. ANSI/NFPA 70 - National Electrical Code.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Cabinets and enclosures shall be delivered to jobsite in original shipping containers and shall be stored in a clean, dry location until ready for installation.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide manufacturer's standard data for enclosures and cabinets.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS

- A. Cabinet and Enclosure manufacturer shall be regularly engaged in construction of Product and shall have at least five years experience.

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as

suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS)

- A. Provide individual containers of touch up paint for each painted cabinet and enclosure.
- B. For each cabinet and enclosure with a locking mechanism, provide two spare keys.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cabinets and Enclosures shall be as manufactured by Hoffman Engineering, Wiegman, Rittal, or equivalent.

2.02 EQUIPMENT SPECIFICATION

A. NEMA 1

Enclosures shall be NEMA 1 rated, hinged, single or double door with slotted flush latch and white interior mounting panel, similar to Hoffman A-xxN Series (where xx is size subseries), or equivalent. Materials of construction shall be 14 or 16 gauge steel, depending on enclosure size, with polyester powder coating. Large enclosures shall have continuous hinge on door. Where noted, large enclosures shall include door operated light kits. Enclosure shall include grounding device kit or other means of positively grounding door to enclosure body.

B. NEMA 3R

Enclosures shall be NEMA 3R rated, hinged with stainless steel hinge pin, with drip shield, single door, white interior mounting panel and easily released door clamps. Materials of construction shall be 16 or 14 gauge steel, depending on enclosure size, with polyester powder coating.

C. NEMA 4X

Enclosures shall be NEMA 4/ NEMA 4X/ NEMA 12 rated, hinged, gasketed, single or double door, with easily released fast-operating clamp assemblies or quarter turn slotted latch kits replacing conventional screw clamps, white interior

mounting panel and stainless steel hinge pin. Materials of construction shall be 16 or 14 gauge (depending on size) Type 304 stainless steel, Type 5052 H-32 aluminum, molded fiberglass polyester or corrosion resistant nonmetallic composite material. Interior mounting panel shall be steel, finish shall be white enamel. Where noted, enclosures shall include door operated light kits. Metallic enclosures shall include grounding device kit or other means of positively grounding door to enclosure body.

D. NEMA 7

Enclosures shall be NEMA 7 rated suitable for Class 1, Division 1, Group D hazardous locations. Materials of construction shall be copper-free aluminum and shall be either U.L. or F.M. listed and labeled for the application. Covers for small enclosures shall be threaded construction with minimum of 5 threads fully engaged after installation. Larger enclosures shall utilize bolted covers with all bolts torqued per manufacturer's requirements after installation.

D. NEMA 12

Enclosures shall be NEMA 12 rated, continuous hinge, gasketed, single or double door, with white interior mounting panel. Materials of construction shall be 16 or 14 gauge steel, depending on enclosure size, with polyester powder coating. Small enclosures shall be similar to Hoffman "CHQR" Series, or equivalent. Medium size enclosures shall include 1-point latch kits or quarter turn slotted latch kits replacing conventional external screw clamps. Large size enclosures shall include 3-point latch kits. Where noted, large enclosures shall include door operated light kits. Enclosure shall include grounding device kit or other means of positively grounding door to enclosure body.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect cabinets, enclosures and mounting panels for damage or rust. Inspect gasketing for proper sealing. Inspect hinges and clamps for proper operation.

3.02 PREPARATION

- A. Thoroughly clean interior and exterior of cabinets and enclosures. Sand and apply touch up paint where needed. Install mounting panels after equipment is mounted to it.

3.03 INSTALLATION

- A. Install cabinets and enclosures at locations shown on drawings and as directed by Owner's representative. Cabinets and enclosures shall be "stand off" mounted 1/2" from wall to provide free air flow behind cabinets and enclosures.
- B. To maintain NEMA 4X enclosure ratings, watertight hubs which are UL listed NEMA 4X shall be installed as necessary at conduit entrances to enclosure.

END OF SECTION 16160

DIVISION 16 - ELECTRICAL
Section 16170 - Grounding and Bonding

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Equipment grounding conductors.
- B. Bonding.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16671 - Transient Voltage Surge Suppression (TVSS)

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code
- B. NFPA 780

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Ground rods shall be tie-wrapped together and stored away from contact with the earth.
- B. Exothermic welds and hardware items shall not be shipped loose but shall be in boxes, labeled with material and equipment enclosed. Boxes shall be stored away from contact with earth and shall be protected from weather.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300
 - 1. Ground rods.
 - 2. Exothermic weld.

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS (RESERVED)

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (RESERVED)

2.02 EQUIPMENT SPECIFICATION

- A. Ground rods shall be UL listed, 3/4" diameter by 10' long copper-clad steel with minimum 10 mil copper coating.
- B. All buried connections of ground components shall be via exothermic weld.
 - 1. Erico - Cadweld
 - 2. Continental Industries – Therm-O-Weld
 - 3. Hagar – UltraweldClamp or compression grounding connectors below grade are not acceptable.
- C. Equipment grounding conductors shall be installed. Insulation shall be 600 volt, same type as phase conductors, green in color. Use yellow tracer stripes to distinguish different grounding systems.
- D. Ground electrode conductors in contact to earth shall be bare stranded annealed copper, sized as detailed on the drawings.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. Equipment grounding conductors shall be identified by the color green and shall be same size and insulation type as phase conductors or as sized on drawings.
- B. It is the intent of this specification that all raceways, boxes, enclosures, etc. include an insulated supplemental equipment ground conductor. Metallic raceway and conduit connectors alone will not be considered as meeting this requirement.
- C. Equipment ground conductor shall have 600 volt insulation and be identified by a continuous green color coating. They shall be used solely for grounding purposes and be entirely separate from white grounded neutral conductor, except at supply side of service disconnecting means, where equipment ground conductors, and system neutral conductors are to be bonded together with the service grounding electrode conductor per NEC requirements. Location of the bond point between the service entrance neutral, equipment ground bus, and grounding electrode conductor shall be accessible for inspection. Do not perform work within utility equipment unless specifically required and directed by utility.

- D. Provide all boxes for proposed outlets, switches, circuit breakers, etc. with grounding screws. Provide all panelboard, switchgear, etc., enclosures with grounding bars with individual screws, lugs, clamps, etc. for each of the grounding conductors that enter their respective enclosures.
- E. All transformer bank grounds shall be grounded in accordance with NEC.
- F. All grounded metal cases and parts associated with electrical equipment shall be tested for continuity with ground system in the presence of Owner's representative.
- G. All exterior metal conduit, where not electrically continuous because of manholes, etc., shall be bonded to all other conduit in duct run, and at each end, with a bare copper conductor as sized from appropriate NEC tables. (Size to be based on largest conductor entering duct). At each building or MCC, conduit grouping shall be bonded to equipment grounding bus of MCC with an insulated conductor (of type used in duct run) as sized from appropriate NEC table.
- H. Ground rods shall be installed where noted or detailed on drawings. Top of ground rods shall be buried a minimum of 1'-0" below grade. Ground wire shall be minimum of #6 AWG, or as noted on drawings, and shall be connected to ground rod by an exothermic weld. All below-grade connections shall utilize exothermic welds.
- I. A continuous grounding system shall be provided throughout jobsite, connecting grounding conductor and equipment grounds to ground rods detailed on drawings. The Contractor shall furnish and install all grounding shown on the drawings, as required by the equipment manufacturer and/or as may be necessary or required to make a complete grounding system as required by the latest National Electrical Code (NFPA 70) in force.
- J. All connections between the different types of grounding conductors above grade shall be made using bolted ground connectors. For ground connections to enclosures, cases and frames of electrical equipment not supplied with ground lugs the Contractor shall drill required holes for mounting a bolted ground connector. All bolted ground connectors shall be Burndy, or equal.
- K. All motor control centers (MCC's) and/or distribution switchboards shall have a buried ground field connected to the equipment ground bus with suitably sized bare copper grounding electrode conductor.
 - 1. The preferred ground field is a triangular ground field, 10 feet on each side, with a driven ground rod at each vertex of the triangle, with suitably sized bare copper grounding electrode conductor connecting the ground rods.
 - 2. If a triangular ground field is not possible due to space constraints, the Contractor shall drive ground rods a minimum of 10 feet apart in a line,

with suitably sized bare copper grounding electrode conductor connecting the ground rods, until installed ground field measures less than 25 ohms as tested. A minimum of two ground rods must be driven, preferably three.

- L. All motor frames, pump bases, conduits, cabinets, boxes, etc. shall be positively bonded. Provide grounding bushings at all conduits entering Service Entrance circuit Breaker Enclosure and bare ground wire from bushing to ground bus in the Service Entrance Equipment.
- M. The ground wire from motors and equipment shall not be smaller than allowed by Table 250-122 "Minimum Size Grounding Conductors for Grounding Raceway and Equipment" of the latest edition of NEC. Unless otherwise noted, minimum equipment ground conductor size shall be #12 AWG stranded copper. Unless otherwise noted, all ground wire shall be insulated green in color, 600 Volt rated. The ground wire shall be adequately protected from damage and shall have continuity with the service entrance ground system.
- N. Bond all noncurrent-carrying parts of equipment to ground system.
- O. A continuous grounding system shall be provided throughout jobsite, connecting grounding conductor and equipment grounds to ground rods detailed on drawings.
- P. Ground lugs shall be provided in all enclosures and wiring termination junction boxes. Equipment grounds and grounding conductor shall be connected to these ground lugs.
- Q. Per NEC requirements, bond building structural steel and accessible metallic water piping to electrical ground system.

3.04 INTERFACE WITH OTHER PRODUCTS

- A. Interface with Electrical Surge Protection Systems installed under Section 16671.

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 TESTING

- A. As described in Specifications Section 16950.
- B. Provide copy of testing report to Engineer for record purposes.

END OF SECTION 16170

DIVISION 16 - ELECTRICAL
Section 16185 - Mechanical Equipment
Wiring

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Power and control wiring for electrical equipment provided by others.

1.02 RELATED SECTIONS

- A. Division 15 - Mechanical.
- B. Section 16010 - General Electrical Requirements
- C. Section 16111 - Conduit and Raceway.
- D. Section 16123 - Building Wire and Cable.
- E. Section 16130 - Boxes
- F. Section 16141 - Wiring Devices
- G. Section 16160 - Cabinets and Enclosures
- H. Section 16170 - Grounding and Bonding
- I. Section 16190 - Supporting Devices
- J. Section 16195 - Electrical Identification
- K. Section 16441 - Enclosed Switches
- L. Section 16950 - Testing Electrical Systems

1.03 REFERENCE TO STANDARDS

- A. NFPA 70 - NATIONAL ELECTRICAL CODE
- B. NEMA - National Electrical Manufacturer's Association.
- C. UL - Underwriter's Laboratories, Inc.
- D. ANSI - American National Standards Institute.
- E. NECA - National Electrical Contractors Association.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be delivered to jobsite in original shipping containers and shall be stored in a clean, dry location until ready for installation

1.05 SUBMITTALS

- A. In accord with Section 01300

PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide all necessary material to complete final power wiring connections to all mechanical equipment items.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Furnish and install all motor starters and disconnect switches.
- B. All integral packaged control panels shall be provided by the Contractor furnishing the equipment. Install power control panels and complete all power wiring. For equipment and motors requiring a direct fixed connection, install liquid tight flexible conduit.
- C. Provide all necessary assistance during start-up and installation to the contractors furnishing the various equipment.
- D. Verify with mechanical contractors as to what electrical equipment is furnished with mechanical equipment. Provide starters unless otherwise noted as such on the Drawings.
- E. Test all motors for proper rotation and phase connection. Verify with ampere meter that motor is running under normal conditions and is not drawing excessive amperage. All motors shall have proper fuse and thermal overload protection.

END OF SECTION 16185

DIVISION 16 - ELECTRICAL
Section 16190 - Supporting Devices

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Strut-type framing for conduit and equipment supports.
- B. Cable Rack saddle-type supports
- C. Anchors and Fasteners.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NECA - National Electrical Contractors Association.
- C. ASTM No. A570 G33
- D. ASTM No. A-123
- E. ASTM No. A-525

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Stored conduit and equipment supports shall not be in contact with earth, but shall be on pallets or other above-grade supports. Conduit and equipment supports shall be covered to minimize exposure to weather.
- B. Anchors and fasteners shall be stored in their original containers in a clean, dry place. They shall not be exposed to weather.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300
- B. Product Data: Provide manufacturer's catalog data for fastening systems and supports.
- C. Manufacturer's instructions: Include application conditions and limitations for use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination and installation of Product.

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY) (RESERVED)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MOUNTING STRUT

- A. Where utilized, strut-type metal framing shall be provided to mount and support electrical equipment and enclosures as indicated on the drawings.
- B. Strut-type supports shall be either aluminum or stainless steel construction. Unless specifically identified for use on the drawings, painted or factory coated steel, galvanized steel or non-metallic strut are not acceptable alternates to this requirement. Use stainless steel on all project locations where strut is in direct physical contact with earth.
- C. Wall mounted strut supports for electrical enclosures shall extend to floor and terminate in strut-type floor flange in order to transfer enclosure weight to the floor rather than wall. Vertical mounted strut sections shall be attached to masonry, where available, with expanding anchors. Vertical strut sections for wall construction using studs shall be solidly anchored at stud locations only.
- D. All mounting hardware shall be stainless steel.
- E. Manufacturers:
 - a. Unistrut
 - b. B-Line
 - c. GS-Metals
 - d. Equivalent meeting specifications

2.02 CABLE RACKS

- A. Cable racks within manholes, handholes and vaults shall be non-metallic saddle type construction as manufactured by Underground Devices, Inc.; Northbrook, IL, or equivalent. All mounting hardware shall be stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine all supports and fasteners for straightness, rust and corrosion. Do not use any equipment that is not straight or is rusted or corroded.

3.02 PREPARATION

- A. All equipment shall be clean at time of installation. Remove all burs.

3.03 INSTALLATION

- A. Install products in conformance with manufacturer's instructions and as detailed on drawings.
- B. Provide anchors, fasteners and supports in accordance with NECA Standard of Installation. Do not use spring steel clips or clamps except as noted in Section 16190-3.03H.
- C. Do not fasten supports to pipes (except where detailed on drawings), ducts, mechanical equipment (except where detailed on drawings), or conduit.
- D. Install surface mounted cabinets, enclosures and panelboards with a minimum of four anchors.
- E. Provide materials, sizes and types of anchors, fasteners, and supports necessary to carry loads of equipment and conduits. Consider weights of equipment and conduit when selecting products.
- F. Provide all necessary hardware, such as floor flanges, in order to install equipment as specified or as shown on the drawings.
- G. Include knee-braces and stiffeners as necessary to provide rigid support such that equipment does not bounce or sway.
- H. Use spring-lock washers under all nuts.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

END OF SECTION 16190

DIVISION 16 - ELECTRICAL
Section 16195 - Electrical Identification

PART 1 GENERAL

1.01 WORK INCLUDES

- A. This section includes field-installed nameplates, labeling and identification methods for electrical equipment, components and wiring.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code

1.04 DELIVERY, STORAGE, AND HANDLING (RESERVED)

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide catalog data for nameplates, labels and markers.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.
- D. During course of construction, Contractor shall submit Wiring Identification Tables, listing wire marker identification schedules of all proposed wiring and terminations.

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)(RESERVED)

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (RESERVED)

2.02 EQUIPMENT SPECIFICATION

- A. Nameplates and legend plates shall be engraved three-layer laminated plastic, black letters on white background. Legends (wording) shall be as detailed on drawings or as directed by Owner's representative .
- B. All wire markers installed on electrical equipment above grade shall be weatherproof and water resistant. Wire identification labeling, whether factory applied or written in the field, shall utilize an adhesive that does not soften or weaken over time. Sleeve or tubing type labels may be utilized as an alternate. Paper adhesive-backed wire markers will be rejected and replaced at the Contractor's expense. Wire marker labels shall be as manufactured by Brady, or equivalent.
- C. All wire markers installed below grade in manholes, handholes or vaults shall be waterproof. Markers shall be non-corroding plastic clip-on sleeve type construction. Markers shall be permanently factory-printed such that label identification will not deteriorate due to time or contact with water. Wire markers used below grade shall be Brady Clip-Sleeve, or equivalent.
- D. Provide and install Safety Stripe Tapes on finished floors around electrical gear noting clearances required per NEC Article 110.26. Tape shall be minimum 2" in width with alternating black/yellow striping. Tape shall be Scotch/3M #5702 or equivalent.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION

- A. Degrease and clean surfaces to receive nameplates, legend plates and markers.

3.03 INSTALLATION

- A. Secure nameplates and legend plates to equipment using screws or adhesive.
- B. Nameplates or legend plates shall be provided for all disconnects, enclosed starters, control panels, levelmeters, flowmeters and recorders.
- C. Contractor shall develop the Wiring Identification Tables to be used for **ALL** wiring terminations on this project, and shall submit Tables for review and comment by Owner's Representative prior to installation of any conductors or cables.

Provide wire markers for **ALL** wires and terminations. By "all", this is intended to include, but not be limited to, all terminations at distribution panelboards, motors,

valves, heaters, fan coils, heat pumps, fans, dampers, all MCC terminations, instrumentation & controls, terminal blocks and strips, etc. Wire identification shall be unique to wire that is marked or to terminal that wire lands upon. Identification of a run of wire from termination to termination shall be same throughout run.

D. Provide wire markers in all manholes, handholes and vaults.

E. Include markers labeled "SP" on all spare conductors.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 AS-BUILT WIRING IDENTIFICATION TABLE

A. Upon completion of project, Contractor shall provide five copies of as-built Wiring Identification Table. This table shall list **ALL** circuits installed as part of this work and shall give identification of ALL wires and terminations as installed and marked.

Table shall include routing of **ALL** conductors installed in the project from end-to-end including each conduit, manhole, handhole and vault through which each conductor passes. Include and identify all spare conductors.

END OF SECTION 16195

DIVISION 16 - ELECTRICAL
Section 16421 - Service Entrance

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work included in this section is labor, equipment and materials necessary to provide a complete and operational service entrance as detailed on drawings and specified herein. All work shall be as shown on project drawings and coordinated with serving utility requirements as attached to the end of this Section.
- B. The new electric service for Strom Water Sampling Building shall be 100A,120/240, 1-Phase, 3-Wire.
- C. Serving Utility shall furnish and install:
1. Medium-Voltage primary cable, installation and terminations.
 2. Service transformer
 3. All metering transformers (C.T.'s and P.T.'s as appropriate).
 4. Termination of secondary conductors on secondary lugs of pole mounted transformer. Conductors to be provided and pulled by Contractor.
 5. KWH Meter instrument.
 6. Installation of secondary metering conductors between metering transformer enclosure and KWH meter equipment. Conduit and pull string meeting utility requirements is to be provided and installed by Contractor.
- D. Contractor shall furnish and install:
1. 2" riser on existing utility pole meeting utility requirements at location noted on project drawings.
 2. At utility riser pole, furnish 1-10 ft section supported per utility requirements.
 3. Conduit and cables between CT cabinet and utility pole.
 4. Termination of service conductors at Service Equipment. Service conductors will be terminated at pole mounted transformer by serving utility.
 5. KWH Meter Cabinet meeting electric Utility requirements
 6. Conduit and pull-string meeting utility requirements between Metering Cabinet pad-mount transformer. Electric utility will furnish and install metering conductors.

7. Any additional work as required by serving utility but not specifically noted herein shall be considered incidental to this section.
8. Grounding and Bonding for Service Entrance is covered under Section 16170.

1.02 Utility Name: Commonwealth Edison
Contact Individual:
Street Address:
City, State, Zip:
Phone No.:
Faximile No.:
e-mail:

1.03 Contractor shall note that all “new service” or “one time charges” that may be billed by the serving utility shall be paid for by the Contractor and included with the base bid price under this item. They will not be paid for separately. However, Contractor shall be responsible to verify to his satisfaction and include such costs, if applicable.

1.04 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceway
- C. Section 16118 – Ductbank
- D. Section 16170 - Grounding and Bonding
- E. Section 16496 - Enclosed Transfer Switch
- F. Section 16671 - Transient Voltage Surge Suppression (TVSS)
- G. Section 16950 - Testing Electrical Systems

1.05 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code
- B. Ameren/IP Requirements

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Equipment shall be stored in original cartons, where applicable, and away from contact with earth and protected from weather and abuse.

1.07 SUBMITTALS (RESERVED)

1.08 QUALIFICATIONS (RESERVED)

1.09 QUALITY ASSURANCE (RESERVED)

1.10 REGULATORY REQUIREMENTS

- A. Contractor shall comply with all requirements of serving utility.

1.11 COORDINATION

- A. Contractor shall coordinate service installation with serving utility.

1.12 MAINTENANCE SERVICE (WARRANTY)

- A. Cable and appurtenances shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion.

1.13 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Contractor shall comply with all requirements of serving utility.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install service entrance conductors between the pole mounted transformer and Service Entrance gear located inside the Storm Water Sampling Building. Conductors shall conform to the requirements as noted in Section 16123 - Building Wire and Cable.
- C. Conduit shall be installed as specified in Section 16111 - Conduit and Raceway and Section 16118 - Duct Bank.
- D. Contractor shall furnish and install utility metering equipment as required by serving utility and shall coordinate the location of this metering with serving utility and owner's authorized representative. Where any conflicts are found between Utility requirements and other portions of this Specification, Utility requirements shall prevail.
- E. Power coordination during construction at an existing facility (if applicable)

In order to minimize down-time to the existing facility, the existing service shall remain in service. Any shutdown or disruption of the existing facility power distribution shall be coordinated with the utility, owner and engineer. A minimum of 72 hours written notice of any such shutdown shall be furnished by contractor before commencing with any such work.

3.06 TESTING

- A. Entire service entrance system shall be tested. Perform testing in accordance with serving utility's recommendations.
- B. Comply with all applicable items in Section 16950 - Testing Electrical Systems

END OF SECTION 16421

DIVISION 16 - ELECTRICAL
Section 16441 - Enclosed Switches

PART 1 GENERAL

1.01 WORK INCLUDES

- A. This section includes enclosed safety switches for use as service disconnects, feeder and branch circuit switching and disconnect switches for motors and equipment.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16170 - Grounding and Bonding.
- C. Section 16190 - Supporting Devices.
- D. Section 16195 - Electrical Identification.

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NEMA KS 1 - Enclosed Switches.
- C. NECA - National Electrical Contractors Association.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Safety Switches (disconnects) shall be stored in original containers as delivered to jobsite. Safety switches shall be stored on pallets or other supports to prevent contact with earth. Safety switches shall be covered to protect them from weather.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide catalog data for switch ratings and enclosure dimensions.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE

- A. Perform work in accordance with NECA Standard of Installation.

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cutler-Hammer
- B. Square D
- C. Siemens
- D. General Electric

2.02 EQUIPMENT SPECIFICATION

- A. Safety switches (disconnects) shall be rated for use at 480 Volts, 3 phase and shall be Heavy Duty, NEMA KS 1 load interruptor enclosed knife switch with externally operated handle interlocked to prevent opening front cover with switch in ON position. Disconnect handle shall be lockable in OFF position.
- B. Safety switch enclosures shall be NEMA 7 where located in hazardous locations, NEMA 4X in exterior non-hazardous locations and NEMA 12 in interior non-hazardous, unless otherwise indicated on drawings.
- C. Where noted, disconnects shall be fusible and shall include high interrupting capacity, Time-Delay Class R fuses, Buss, or equivalent, of ampacities noted on the drawings. Three spare fuses of ampacity noted on drawings shall be provided with each fusible disconnect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect safety switches for proper operation. Disconnect switch movement shall not bind at any point in its travel. Inspect enclosures for corrosion and water tightness.

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. Install safety switches (disconnects) where detailed on drawings. All switches shall be mounted to strut-type framing.
- B. All safety switches shall be bonded to equipment grounding system.
- C. Provide nameplate for each safety switch as detailed on drawings or as directed by Owner's representative.
- D. Inspect all disconnects for proper operation, tight and secure connections, and correctness. Adjust as necessary to assure proper operation.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 TESTING

- A. Test all disconnects for proper operation and continuity on all poles when in the closed (ON) position.

END OF SECTION 16441

DIVISION 16 - ELECTRICAL
Section 16470 - Panelboards

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply and installation of power and lighting panelboards to provide a complete and operational electrical system.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceway
- C. Section 16123 - Building Wire and Cable
- D. Section 16170 - Grounding and Bonding
- E. Section 16190 - Supporting Devices
- F. Section 16195 - Electrical Identification
- G. Section 16671 - Transient Voltage Surge Suppression (TVSS)

1.03 QUALITY ASSURANCE

- A. Panelboards shall be manufactured and supplied by a company regularly engaged in business of furnishing panelboards. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of panelboards.

1.04 REFERENCE TO STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. U.L. Standard 489 - Molded Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures
- C. U.L. Standard 67 - Panelboards
- D. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- E. NFPA 70 - National Electrical Code.
- F. NECA (National Electrical Contractors Association) "Standard of Installation".
- G. NEMA AB 1 - Molded Case Circuit Breakers.
- H. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- I. NEMA KS 1 - Enclosed Switches.
- J. NEMA PB 1 - Panelboards.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Submittals shall include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes. Submittals shall also include manufacturer's installation instructions; indicating application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting the product.

1.06 DELIVERY STORAGE AND HANDLING

- A. Panelboards shall be stored indoors from time of delivery to jobsite, protected from weather and damage.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cutler-Hammer/Westinghouse.
- B. Square D.
- C. General Electric.
- D. Siemens
- E. Equivalent

2.02 EQUIPMENT

- A. Panelboard shall be provided with bolt-on circuit breakers of size and rating as detailed in panel schedule on plans. Breakers shall be 1, 2 or 3-pole with an integral crossbar to assure simultaneous opening of all poles in multipole circuit breakers. Breakers shall have an overcenter, trip-free, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication. Handles shall have "ON", "OFF" and "TRIPPED" positions. Circuit breakers shall be UL listed in accordance with UL Standard 489.
- B. Panelboards bus structure and main lugs or main circuit breakers shall have current ratings as shown on panelboard schedule. Such ratings shall be in accordance with UL Standard 67. Bus bar connections to branch circuit breakers shall be the "distributed phase" or phase sequence type. All current carrying parts of bus structure shall be plated.
- C. Panelboard bus assembly shall be enclosed in a steel cabinet rated NEMA 1 (unless otherwise noted on the plans). Box front shall include a door and have a flush, cylinder tumbler-type lock and catch and spring-loaded stainless steel door pull. Door shall have completely concealed hinges when closed and shall not be removable when locked. A circuit directory frame and card with a clear plastic cover shall be provided on door interior.
- D. Panelboards rated 240 VAC or less shall have short-circuit ratings as shown on the drawings, or as herein scheduled, but not less than an integrated equipment rating of 10,000 amps RMS symmetrical. All units shall bear UL label.
- E. Panelboards rated 480 VAC shall have short-circuit ratings as shown on the drawings, or as herein scheduled, but not less than an integrated equipment rating of 65,000 amps RMS symmetrical. All units shall bear UL label.

- F. Except where noted otherwise on the drawings, all panelboards shall have neutral bar and ground bar bonded together. Where neutral bar and ground bar are noted to be isolated, the contractor shall verify during wiring installation that neutral and ground conductors are terminated on the correct bar.
- G. Where schedule on drawings indicates "SPARE", a complete circuit breaker of the ampacity and number of poles indicated is to be provided. Where schedule on drawings indicates "SPACE", provisions for a future circuit breaker and blank cover is to be provided to permit circuit breaker to be added in the field.
- H. All circuit breakers feeding HVAC equipment shall be HACR rated.

PART 3 EXECUTION

3.01 INSPECTION

- A. Panelboards shall be thoroughly inspected for physical damage, proper alignment, anchorage, and grounding. Exterior finish shall be inspected for blemishes, nicks, and bare spots and touched up as required using touch-up paint provided. Inspection shall be made for proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

3.02 INSTALLATION

- A. Install panelboards where shown on the plans, in accordance with manufacturer's directions and in accordance with NEMA PB1.1. Install panelboards plumb. Provide filler plates for unused spaces in panelboards. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes as required.
- B. Provide legend plates for all panelboards to identify panelboard as well as voltage, phase and number of wires (example "LP-1, 208Y/120 VAC, 3 PHASE, 4 WIRE"). Legend plates shall comply with Section 16195 - Electrical Identification.
- C. Panelboard transient voltage surge suppression (TVSS) shall be installed in compliance with Section 16671.

3.03 TESTING

- A. Panelboards and load centers shall be thoroughly tested after installation and connection to respective loads. Lighting panelboard phases shall be measured with all major items operating. Phase loads shall be within 20 percent of each other. Rearrange circuits if required maintaining proper phasing for multi-wire branch circuits.
- B. Test for shorts and high resistance grounds. Check for faulty operation of circuit breakers and correct as needed.

END OF SECTION 16470

DIVISION 16 - ELECTRICAL
Section 16510 - Luminaires

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is interior lighting fixtures, lamps, accessories and installation and connection to wiring and ducts required for a complete and operational interior lighting system at facility.
- B. This work shall also include lighting fixtures mounted to building exterior walls and structures, including lamps, accessories and installation and connection to wiring and ducts required for a complete and operational lighting system at facility.
- C. This work shall also include pole mounted light fixtures, including, poles, concrete foundations (where required), including lamps, accessories and installation and connection to wiring and ducts required for a complete and operational lighting system at facility.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16111 - Conduit and Raceway
- C. Section 16118 - Duct Bank
- D. Section 16123 - Building Wire and Cable
- E. Section 16130 - Boxes
- F. Section 16170 - Grounding and Bonding

1.03 REFERENCE TO STANDARDS

- A. NEC Article 410 - Light Fixtures, Lampholders, Lamps and Receptacles.
- B. U.L. listing as "Suitable for Wet Locations".
- C. Illuminating Engineering Society (IES) of America.

1.04 DELIVERY, STORAGE AND HANDLING

- A. All fixtures, ballasts and lamps shall be delivered in manufacturer's cartons and shall be stored inside, away from construction until just prior to installation. Under no circumstances shall they be stored outdoors or subject to weather.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300
- B. Submittals will be required on all lighting fixtures, poles and accessories to be used at this facility.

1.06 QUALIFICATIONS

- A. Manufacturer, catalog number, type, wattage, and lamp data for each fixture as listed in Light Fixture Schedule on drawings establish acceptable minimum standard of quality, type of construction, and size of respective item.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner..

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Fluorescent Fixtures:

Fluorescent fixtures shall be as shown in Light Fixture Schedule on drawings, or equal. Light fixtures and lamps shall conform to latest Federal Agency Policy requirements for efficiency. Ballasts shall be NEC Class P with automatic resetting thermal protection adjacent to coil and non-resetting protection for capacitor. Ballasts shall be UL labeled, CBM certified by ETL, HPF, and shall have an "A" sound rating. Ballasts shall be Advance, General Electric, Jefferson, Universal, or equal. All fixtures shall be listed as suitable for use in wet areas, except for lay-in style for installation in drop ceiling grids.

Sealed Fluorescent Fixtures specified with emergency battery packs for application in wet or damp locations listing shall utilize battery systems which do not void any certifications or listings on the equipment. All submittals on emergency fluorescent fixtures with wet or damp listings shall clearly indicate equipment remains sealed (not vented) and maintains UL approval and listing with battery packs installed.

- B. Fluorescent Lamps:

All fluorescent lamps shall be furnished and installed by electrical contractor. Fluorescent lamps shall be as shown in Light Fixture Schedule on drawings.

- C. H.I.D. Fixtures:

H.I.D. fixtures shall be as shown in Light Fixture Schedule on drawings, or equal. Ballasts shall have Class H insulation and shall be high power factor with minimum of 90% power factor for high pressure sodium or metal halide units. Capacitors shall be of non-PCB type. H.I.D. lamp socket shall be of mogul base type. Internal wiring shall be suitable for 150°C. minimum. All fixtures shall be listed as suitable for use in wet areas.

- D. H.I.D Lamps:

All H.I.D. lamps shall be furnished and installed by electrical contractor.

- E. Unless otherwise noted on the drawings, furnish exterior wall mounted fixtures with individual integral photocell control.
- F. Light fixtures noted to be "explosion-proof" shall be "Factory Sealed" and shall not require conduit seals within 18" of fixture.
- G. Light fixtures shall include all mounting hardware and appurtenant materials and equipment as required to provide a complete and operational lighting system.

PART 3 EXECUTION

3.01 INSPECTION

- A. All light fixtures, poles and hardware shall be inspected for physical damage and corrected as required prior to installation. Gasketing shall be inspected for proper fit and sealing. Any defective or broken lamps, poles and hardware shall be replaced at no cost to contract.

3.02 INSTALLATION

- A. Light fixtures shall be installed at locations shown on drawings or as directed by Owner's representative. All fixtures shall be cleaned inside and out just prior to installation. All fixtures shall be located such that they may be easily maintained.

3.03 TESTING

- A. All luminaries shall be tested for proper operation after installation and defective equipment shall be replaced at no cost to contract.

END OF SECTION 16510

DIVISION 16 - ELECTRICAL
Section 16671 – Transient Voltage Surge
Suppression (TVSS)

PART 1 GENERAL

1.01 WORK INCLUDES

- A. This specification describes the requirements for “Transient Voltage Surge Suppression” or “TVSS”. TVSS equipment shall be furnished for all locations where noted on project Drawings, referenced in other equipment specifications or as described herein.
- B. Unless noted otherwise on the drawings, furnish and install new surge protection equipment for power feeds for all new MCC’s, lighting and power panelboards, switchboards, electronic equipment and control panels.
- C. Additionally, where drawings note to add surge protection to existing equipment, provide equipment as specified below or as noted on the project drawings.
- D. Provide supplemental Surge Suppressors on each end of all 4-20 mADC signal lines which originate at, or terminate on, devices located on exterior of building. Typical equipment would include, but not be limited to, mag-meters located in exterior meter pits and wet-well transmitters. Where 4-20 mADC signals both originate and terminate within a single building, no supplemental surge protection is required.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16170 - Grounding and Bonding.

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code (most current issue).
- B. U.L. 1449 “2nd Edition” - Transient Voltage Surge Suppressors
- C. U.L. 1283 – Electromagnetic Interference Filters.
- D. IEEE C62.41– Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits
- E. IEEE C62.45 – Guide on Surge Testing for Equipment Connected to Low-Voltage Power Circuits
- F. NEMA LS-1 – Low Voltage Surge Protection Devices

1.04 DELIVERY, STORAGE AND HANDLING

- A. Electrical surge protection equipment shall be stored in a clean dry place, away from construction.

1.05 SUBMITTALS

- A. Submit under the provisions of Section 01300
- B. Product Data: Provide catalog data for electrical surge protection equipment.
- C. Provide information to verify 3rd party testing certification on assembled equipment ratings. Ratings on individual components will not meet this requirement and will not be considered.
- D. Manufacturer's Instructions
Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS

- A. Electrical surge protection equipment shall be furnished by manufacturer regularly engaged in the construction of electrical surge protection equipment, having minimum of five years experience in the manufacture of TVSS hardware.
- B. Third party tested for compliance.

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. As a minimum, all equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. All Electrical Surge Protection hardware shall be U.L. Listed and labeled as “LISTED TVSS” equipment under the latest edition of UL 1449 “2nd Edition”.
- B. Visual indication that surge suppressors are functioning properly shall be furnished in the form of display, pilot light or LED for each device. If manufacturer utilizes LED’s or pilot lights, one indicator shall be provided for each leg of a multi-phase device.
- C. Where TVSS hardware is not an integral part of a factory-assembled piece of equipment (such as factory installed in a switchboard or MCC), manufacturer or Contractor shall furnish all equipment, brackets and appurtenances necessary in order to properly install suppressors to manufacturer’s requirements.

D. Electrical Requirements – Power Distribution Equipment

- 1. Unit operating voltage and configuration – Refer to Drawings
- 2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall be greater than 115% of the nominal system operating voltage.
- 3. Protection Modes – For a wye configured system, the device shall have directly connected suppression elements between line-to-neutral (L-N), line-to-ground (L-G), and neutral-to-ground (N-G) providing 7-modes of protection. For a delta-configured system, the device shall have suppression elements between line-to-line (L-L) and line-to-ground (L-G) providing 6-modes of protection.
- 4. Suppressed Voltage Ratings (SVR) shall not exceed the following per UL-1449:

Modes	208Y/120	480Y/277
L-N; L-G; N-G	400 V	800 V
L-L	800 V	1800 V

- 5. ANSI/IEEE Cat. C3 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for Category C3 surges (20 kV, 10 kA) shall be less than:

Modes	208Y/120	480Y/277
L-N	560 V	960 V

- 6. ANSI/IEEE Cat. B3 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for the ANSI/IEEE Cat. B3 ringwave (6 kV, 500 amps) shall be less than:

Modes	208Y/120	480Y/277
L-N	160 V	160 V

- 7. Each unit shall include an EMI/RFI filter. Filter shall comply with UL-1283.

8. Where practical, and to aid in keeping power lead/bus length short, TVSS may be integrated into electrical distribution equipment enclosures.
9. In order to isolate the TVSS under fault conditions, the TVSS assembly shall be U.L. rated for the same short circuit fault duty rating as the equipment to which it is connected. Provide supplemental fusing, if required, in order to meet this requirement. All overcurrent protection components shall be tested in compliance with UL 1449 – Limited Current Test and AIC Ratings.
10. Devices shall be provided with integral thermal protection to disconnect the suppression components during an overheated MOV condition.
11. Minimum Repetitive Surge Current Capability: The device shall be repetitive surge tested in every mode utilizing Category C3 waveshapes at minimum of one minute intervals without suffering either performance degradation or more than 10% deviation of clamping voltage at a specified surge current. The minimum repetitive surge current capability as per ANSI/IEEE C62.41 and ANSI/IEEE C62.45 shall be:
 - a. Service Entrance: 12,000 impulses per mode.
 - b. Branch Location (MCC's & Swbds): 500 impulses per mode.
 - c. Branch Location Panelboard: 100 impulses per mode.
12. Surge Current Capacity: The minimum surge current 8 x 20:second waveform that the TVSS device is capable of withstanding shall be no less than that shown in the following table:

Minimum total Surge Current and Withstand Capability with Compliance to ANSI/IEEE C62.41 and NEMA LS-1			
Application	Per Phase	Per Mode	Surge Withstand Capabilities ANSI/IEEE C3 Wave (10kA)
<u>All Service Entrance Equipment</u> (Switchgear, Switchboards, MCC's, and other S.E. listed equipment)	240 kA	120kA	12,000 events
Branch Locations (Non-S.E. MCC's & Switchboards)	120 kA	60 kA	500 events
Branch Locations (Non-S.E. Panelboards)	40 kA	20 kA	100 events

13. Lighting and Distribution Panelboard Requirements. The following additional requirements shall apply when drawings indicate that the TVSS equipment is to be integral to the panelboard and mounted within the enclosure housing.
 - a. The TVSS units shall be tested to demonstrate suitability for ANSI/IEEE C62.41 Category C1 environments.
 - b. The TVSS shall not limit the use of Through-feed lugs, Sub-feed

- lugs and Sub-feed breaker features, where applicable.
- c. The TVSS shall be immediately installed on the load side of the main breaker.
- d. The panelboard shall be capable of re-energizing upon removal of the TVSS.
- e. A direct bus bar connection shall be used to mount the TVSS component to the panelboard bus bar to reduce the impedance of the shunt path.
- f. The TVSS panelboard shall be constructed using a direct bus bar connection.
- g. The TVSS shall be included and mounted within the panelboard by the manufacturer of the panelboard.
- h. The complete panelboard including the TVSS shall be UL-67 listed.

14. Switchgear, Switchboard, MCC and other Service Entrance equipment

- a. The TVSS application covered under this section shall be 3rd party tested and suitable for ANSI/IEEE C62.41 Category C3 environments.
- b. The TVSS shall be located on the load side of the main disconnect device, as close as possible to the phase conductors and ground/neutral bar.
- c. Provide a 30-amp disconnect. The disconnect shall be directly integrated to the suppressor assembly.
- d. Provide factory-installed digital surge counter and form C dry-contact alarm that changes state if any of the three phases detect a faulted, open or other reduced protection condition.
- e. All monitoring diagnostic features shall be visible from the front of the equipment.

E. Control Panels (120 VAC Supply): All fabricated control panels requiring 120 VAC supply power which contain relays, timers or other electrical and electronic equipment shall be provided with a Series-type surge protection on the input supply power. Units shall be Series 400 from MCG Surge Protection, or equivalent. Panel manufacturer/supplier shall select proper model based upon load ampacity requirements.

F. Instrumentation Signal Protection. All analog instrumentation 4-20 ma signal cables which originate or terminate on an instrument installed on building exterior shall be individually protected with surge suppression at both ends of cable.

- 1. All Instrumentation Signal Surge Suppressors mounted within control panels shall be Bourns (formerly Joslyn) Model 1820-28 (DIN Rail mount), or equivalent.
- 2. All Instrumentation Signal Surge Suppressors mounted at field mounted equipment shall be Bourns (formerly Joslyn) Model 1669-02 (½" pipe nipple mount), or equivalent.

G. Surge Protection for DeviceNet Network

Where shown on the drawings, provide UL-497B DeviceNet surge protection devices. Surge protection may be installed within DeviceNet equipment where practical. Where other enclosures are unavailable, provide suitably sized NEMA 4X Non-Metallic enclosure to house Surge Protection equipment. DeviceNet Surge Protection devices shall be Leviton Model #3863-DEV.

H. Surge Protection for Ethernet Network

Where shown on the drawings, provide UL-497B Ethernet surge protection devices. Surge protection may be installed within other Ethernet equipment, Local Control Panels or PLC enclosures, whichever best suits particular project networking architecture and equipment. Where other enclosures are unavailable, provide suitably sized NEMA 4X Non-Metallic enclosure to house Surge Protection equipment. Ethernet Surge Protection devices shall be furnished with standard RJ-45 Input and Output jacks. Ethernet Surge Protection devices shall be Leviton Model #3861-ETH.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. Control panel surge protection shall be installed per manufacturer's instructions by panel builder prior to shipment.
- B. Surge protection equipment for all other locations shall be installed per manufacturer's instructions and requirements.

END OF SECTION 16671

DIVISION 16 - ELECTRICAL
Section 16902 - Electric Controls and
Relays

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply of electrical controls not specified elsewhere, including switches, pushbuttons, relays, time delays, indicating lights, limit switches, floats, related enclosures and miscellaneous equipment as shown on plans and specified herein.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16111 - Conduit and Raceway.
- C. Section 16123 - Building Wire and Cable.
- D. Section 16141 - Wiring Devices.
- E. Section 16160 - Cabinets and Enclosures.
- F. Section 16170 - Grounding and Bonding.
- G. Section 16190 - Supporting Devices.
- H. Section 16195 - Electrical Identification.
- I. Section 16671 - Transient Voltage Surge Suppression (TVSS).

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code (most current issue).
- B. NECA - National Electrical Contractors Association.
- C. NEMA ICS 1 - General Standards for Industrial Control Systems.
- D. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- E. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- F. U.L. 508 - Industrial Control Panels
- G. U.L. 698A - Industrial Control Panels Relating Hazardous (Classified) Locations.
- H. U.L. 913 - Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, III, Division 1 Hazardous (Classified) Locations.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Items shall be stored in original containers and shall be stored indoors, protected from weather and construction.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.

- B. Product Data: Provide catalog data for all control panels.

Data submittals shall include complete, detailed, annotated schematics, product data on all components, product layout and dimensions, mounting details, including supports.

- C. Manufacturer's Instruction Information

Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE

- A. Control panels shall be assembled and wired by a UL 508 listed panel manufacturer, requiring only installation and connection to external wiring in field.
- B. Control panels having field devices located within a Hazardous (Classified) location shall comply with U.L. 698A requirements. Intrinsically Safe Barriers shall comply with U.L. 913.
- C. Control panel shall be tested prior to delivery to jobsite.

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MISCELLANEOUS EQUIPMENT SPECIFICATIONS

- A. Unless specified otherwise on the drawings, pushbuttons, selector switches, indicating lights, etc., shall be heavy duty, Full-Size (30 mm) NEMA 4X, Square D type SK, or equivalent.

- B. Unless specified otherwise on the drawings, control relays shall be heavy duty, socket mount, 120VAC operation, 10 Amp minimum contact rating, Potter & Brumfield KRP-14AN-120VAC, or equivalent. Provide all relays complete with matching plug-in socket.
- C. Unless specified otherwise on the drawings, time delay relays shall be heavy duty, socket mount. 120VAC operation, 10 Amp minimum contact rating, Potter & Brumfield CDB-38 series, or equivalent. Provide all timing relays complete with matching plug-in socket.
- C. Enclosures shall comply with applicable portions of Section 16141 - Wiring Devices or Section 16160 - Cabinets and Enclosures.
- D. Unless specified otherwise on the drawings, intrinsically safe isolated switches shall be Diversified Electronics, Model ISO-120-AFA with matching socket PF083A or equivalent.
- E. Where indicated on the drawings, door limit switches shall be capacitance type suitable for use on either metallic or non-metallic sensing with field-adjustable sensitivity of 0-30 mm. Materials of switch construction shall be non-metallic such as Crastin. Device output shall be field programmable as either normally-open or normally-closed. Switches shall be 2-wire type suitable for use on 120 VAC. Capacitance type limit switches shall Pepperl+Fuchs Model # CJ15-40-W/BF-40 or equivalent

PART 3 EXECUTION

3.01 INSTALLATION

- A. Items shall be installed per manufacturer's recommendations and as detailed on plans.
- B. Install panel enclosures as detailed on plans and as specified in Section 16160 - Cabinets and Enclosures.

3.02 TESTING

- A. All equipment shall be thoroughly tested for proper operation. Defective or malfunctioning equipment shall be immediately replaced at no charge to Contract.

3.03 MANUFACTURERS SERVICE

- A. Under provisions of Section 01435 - Manufacturer's Service
- B. Under provisions of Section 01820 - Demonstration and Training

END OF SECTION 16902

DIVISION 16 - ELECTRICAL
Section 16903 – Programmable Logic
Control Panels

PART 1 GENERAL

1.01 WORK INCLUDES

Work under this section is to provide the PLC control panel PLC-100 located inside the Storm Water Sampling Building as described herein and/or as detailed on project drawings.

1.02 DESCRIPTION

- A. All PLC control panels shall be furnished complete; including but not limited to, fabrication, testing, programming, field installation, debugging, start-up, commissioning, cable, conduit and terminations in order to provide a fully functional system to the satisfaction of the Engineer and Owner.
- B. To ensure sole-source responsibility, a single Systems Integrator shall furnish all PLC control panels specified under this section, including networking, programming, start-up and commissioning as well as all SCADA computer hardware, software and programming under Section 16905.

1.03 RELATED SECTIONS

- A. Section 01300 - Submittal Procedures.
- B. Section 16160 - Cabinets and Enclosures.
- C. Section 16671 – Transient Voltage Surge Suppression (TVSS)
- D. Section 16902 - Electric Controls and Relays

1.04 REFERENCE

- A. ANSI/NFPA 70 - National Electrical Code (most current issue).
- B. NECA - National Electrical Contractors Association.
- C. NEMA ICS 1 - General Standards for Industrial Control Systems.
- D. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers & Assemblies.
- E. NEMA ICS 3 - Industrial Systems.
- F. ANSI/ISA - RP-12.6 - Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations

- G. U.L. 508 – Industrial Control Equipment
- H. U.L. 913 – Intrinsically Safe Apparatus and Associated Apparatus for Use Class I, II III, Division 1, Hazardous (Classified) Locations

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide catalog data for all control panel components and modules.
 - 1. Data submittals shall include complete, detailed, annotated schematics, product data on all components, product layout and dimensions, mounting details, including supports.
 - 2. PLC logic printouts are not required as submittal information. However, Contractor shall be solely responsible for providing a functional system meeting all the requirements and sequence of operation as specified herein. As part of the Record Drawings, the Contractor shall furnish “as-built” PLC logic as required in Part 2 of this specification.
- C. U.L. Identification Number for Control panel manufacturing facility
- D. Manufacturer’s Instructions: Indicate applicable conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation and operation of Product.

1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section.
- B. System Integrator: Company specializing in and experienced in integrating PLC’s, instrumentation, control valves, pumps, chemical feeders, supervisory SCADA computers, radio telemetry and related equipment into a fully functional control system.

1.07 QUALITY ASSURANCE

- A. To assist in quality assurance, PLC control panels shall be assembled and wired by a UL 508 listed panel manufacturer, requiring only installation and connection to external wiring in field. Each individual control panel shall bear a uniquely serial-numbered U.L. listing label.
- B. All control panel Discrete Inputs, Discrete Outputs, Analog Inputs, Analog Outputs and programming shall be tested prior to delivery to jobsite.

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Accept products on site in factory containers. Inspect for damage.
- C. Store products in clean, dry area; maintain temperature to NEMA ICS 1.

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. Furnish manufacturer's authorized service and maintenance of PLC system for a minimum period of one (1) year from date of substantial completion established by Owner.
- B. Furnish replacements for all defective PLC system components for a minimum period of one year from date of substantial completion established by Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Design Documents have been based on:
 - 1. Rockwell/Allen-Bradley SLC 5/05 (1747-L553) and Flash EPROM memory module (1747-M13)
- B. Other acceptable base-bid manufacturers
 - 1. Approved equivalent
- C. Alternates
 - 1. None

2.02 PROGRAMMABLE LOGIC CONTROLLERS

- A. Description: Programmable Logic Controller (PLC) manufactured to NEMA ICS 3.
- B. Service Conditions:
 - Temperature (operating) 0 to 60°C
 - Temperature (non-operating) -40 to 85°C

Humidity.....5 to 95 %, non-condensing
Altitude..... up to 6600 feet (2000 meters)
Supply Voltage..... 120 VAC, 60 Hz
Electrical Noise Immunity.....NEMA ICS 2-30

C. Configuration:

1. PLC system: System is to include one (1) PLC (PLC-100) located inside the Storm Water Sampling Building.
2. Each PLC Assembly: Include enclosure, wire duct, terminal blocks, fuses or circuit breakers, surge suppressors, PLC processor, power supply, Input/Output modules, backplane or rack, communication port(s), programming port, fiber-optic interface, interconnecting wiring and all programming for a complete & operational system.
3. Ratings: I/O type and quantity for each location is shown in the Input/Output list at the end of this section.

D. Processor Unit (CPU)

1. Memory Size (minimum):.....64 k Words
2. I/O Capability..... Up to 4096

E. Input/Output Modules

1. Digital Input (8-Point Isolated 120 VAC) (Spectrum Controls)..... 1746sc-IA8I
2. Digital Output (8-Point Isolated relay contact) (Allen-Bradley) 1746-OX8
3. Analog Input (4-Point Isolated 4-20 ma) (Spectrum Controls) 1746sc-INI4i
4. Analog Output (4-Point Isolated 4-20 ma) (Spectrum Controls) ... 1746sc-INO4i

Spectrum controls is a Rockwell Automation “Encompass” Global Partner and manufacturers add-in products for the Allen-Bradley PLC line.
<http://www.spectrumcontrols.com>

Provide sufficient unused I/O rack space to allow for future installation of 10% (minimum) additional I/O modules. If required, increase rack and enclosure sizes in order to accommodate.

F. Fiber-Optic Ethernet Network Module for Allen-Bradley SLC-5 PLC

1. Phoenix Digital (w/4 RJ-45 UTP Ports).....OLC-ETF-85-D-ST-4A1
Jumper Ethernet Port #1 for use by local PLC.

Phoenix Digital is a Rockwell Automation “Encompass” Global Partner and manufacturers add-in products for the Allen-Bradley PLC line.

G. PLC Processor Power Supply

1. Input Voltage (nominal) 120 VAC
2. Capacity As Required for internal devices specified

H. Enclosure

Stainless-Steel, Type 4X (ICS 6), Hoffman, or equivalent sized as required to house specified equipment with minimum 10% future I/O rack space for future modules. Include sufficient space for UPS specified elsewhere this section.

I. Control Power

As a minimum, provide each of the Programmable Logic Control Panels with a door-mounted, 30.5 mm, NEMA 4/13, Transformer-Type LED lamp, 120 VAC White Pilot Light. Pilot Light shall be Allen-Bradley 800T-PH16W with engraved legend plate "CONTROL POWER ON". Provide each unit with additional 2-position key-type selector switch 800T-H33A with engraved legend plate "OFF-ON", or equivalent. Coordinate key-type selector switches on all PLC control panels to be keyed alike.

- J. Provide each of the Programmable Logic Control Panels with a 10 Amp, 1-Pole DIN-Rail mounted circuit breaker for input power. Circuit Breaker shall be Allen-Bradley #1492-CB1G100, or equivalent.

K. Secondary 120 VAC Surge Arrester

Secondary surge arrester shall be provided by the control panel manufacturer and be as specified under Section 16671-2.01E. Install per manufacturer's directions, include mounting bracket or plate as required.

L. DeviceNet Surge Protection

Where DeviceNet is utilized on the project, provide DeviceNet Surge Protection as shown on Project Drawings and as specified in Section 16671.

M. Ethernet Surge Protection

Where copper Ethernet is utilized on the project, provide Ethernet Surge Protection as specified in Section 16671. (Not required on projects where Ethernet cable does not extend to a structure exterior, or on projects utilizing fiber-optic network media.)

N. Analog Loop Surge Protection

Provide DIN-rail mounted supplemental Surge Suppressors on all 4-20 mADC Analog Inputs and Outputs which originate at, or terminate on, devices located on exterior of building. Typical equipment would include mag-meters located in exterior meter-pits and wet-well level transmitters. These devices are to limit electrical surges which might be transmitted from exterior wiring back into the PLC hardware over the 4-20 mADC signal cables. Supplemental analog surge protection shall be as specified in Section 16671-2.01F1. Analog I/O which both originates and terminates within a single building does not require supplemental Surge Suppressors.

O. Enclosure Light

Provide each PLC control panel with interior door-activated fluorescent light. Unit shall be Hoffman A-LTDB1 or X-LF16D18 as applicable for enclosure size.

P. Provide each of the Programmable Logic Control Panels with a 24 VDC, 2 Amp power supply for 2-wire Analog Loop Excitation. To allow for future use, this item is to be furnished in each of the PLC panels, whether or not required by other project equipment. Wire the D.C. output to terminal blocks and appropriately label for easy identification. D.C. power supply shall be DIN-Rail mounted type, Phoenix Contact Model #MINI-PS-100-240AC/24DC/2A, Phoenix Order No. 29-38-73-0, or equivalent.

Q. GFCI Receptacle

Provide 120 VAC convenience GFCI duplex outlet installed in device box on control panel interior. Note that this receptacle is in addition to the simplex UPS supply receptacle specified in elsewhere this section.

R. PLC enclosure shall be provided with 300 Volt DIN-Rail mount tubular compression type terminal blocks for all field wiring connection points. All PLC I/O points (including all spare/unused I/O points) and supply conductors shall be factory wired to terminal blocks. Provide minimum 10% spare terminal blocks. No field wiring shall be directly connected to PLC I/O modules.

S. Where required or specified, control operators and pilot relays shall be as specified in Section 16902 unless otherwise noted.

T. Enclosure Heater

For all exterior applications and interior locations where noted on the drawings, provide a condensation heater sized as required for the control panel enclosure to minimize moisture that may accumulate inside the equipment. Include integral thermostat and circulating fan for heater. Circulating fan shall be 4" to 6" nominal diameter axial type fan with wire guards, 115 VAC, 60 Hz. Thermostat shall be

line voltage thermostat, 120 VAC, 5 Amp minimum current rating, SPST, with adjustable control knob. Enclosure heater shall be as manufactured by Honeywell, White-Rogers, Hammond, Hoffman, or Chromalox.

U. Uninterruptible Power Supply (UPS)

Provide each PLC panel with an internal Off-Line UPS to power all components within each panel in the event of power outage or disruption. Both Input and Output of the UPS shall be 120 VAC, 60 Hz. UPS capacity shall be no less than 850VA/510W. Unit shall be DIN Rail mountable. UPS shall be Sola/Hevi-Duty Model SDU850 including I/O relay box P/N #RelayCard-SDU and SDU-PMBRK bracket kit, or equivalent.

1. Provide two NEMA 5-20R receptacles on the interior of each PLC Control Panel. One receptacle is to be fed directly from the incoming "raw" 120 VAC supply power from the upstream lighting panelboard. The second receptacle is to be fed from the 120 VAC output of the UPS described above.
2. The "PLC line power" terminals for the PLC panel shall be connected to a NEMA 5-15P plug thru a five (5) foot length of "SO" cord.
3. Under normal conditions, the UPS "line" plug will be inserted into the "raw" receptacle and the "PLC line power" plug will be inserted into the receptacle fed from the output of the UPS.
4. The intent of the above arrangement is to permit removal of the UPS for service or repair by directly plugging the "PLC line power" plug directly into the "raw" 120 VAC supply power receptacle. (It is recognized that this action will require a momentary shut-down of the PLC.)
5. Provide a sufficiently sized NEMA 4X PLC enclosure such that the UPS can be DIN rail mounted near the bottom of each enclosure.

V. Control operators and pilot relays shall be as specified in Section 16902 unless otherwise noted on the drawings or specified herein.

W. Cell Phone Dialer

Provide, connect and configure (2) cell phone alarm dialers, one for Storm Water Sampling Building and one for sanitary lift station alarms. The auto-alarm dialer shall be model number 1800, as manufactured by sensaphone or approved equal. Auto-alarm dialer shall be capable of sending alarm text messages to cell phone without the use of land line. Auto-alarm dialer shall be configured to transmit all alarm conditions from PLC-100, BOD analyzer, ammonia analyzer and sanitary lift station controller.

X. Documentation & Software

1. Programming Software:

Include one (1) Windows compatible PLC programming package, complete with documentation for the manufacturer of the model of PLC provided. License shall be in the name of the owner.

2. Final Program

Provide (1) copy of the final program logic complete with annotation to the Owner after start up and all de-bugging and commissioning has been completed. The PLC data image shall be as provided by the programming software specified above. PLC logic shall be furnished on either 3-1/2" floppy disks or CD-ROM and also provide one copy of hard copy printout on bound 8.5"x 11" paper.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Equipment supplier shall develop and enter PLC control logic based upon the sequence of operation furnished in these specifications as Part 4 - Control Sequence of Operation.
- B. Do not install products until major construction is complete and building interior is enclosed and heated.
- C. Connect input and output devices as indicated on the plans.
- D. Contractor and supplier shall furnish any other items not specifically noted or detailed in order to provide for a functional system as described in these specifications.
- A. At completion of start-up and commissioning of the equipment furnish one box (5) minimum quantity of each type and size of fused used in the control panel for spares.

3.02 FIELD QUALITY CONTROL

- A. Perform operational testing on control systems to verify proper operation and field wiring connections.

3.03 DEMONSTRATION

- A. Under provisions of Section 01435 - Manufacturer's Service.
- B. Demonstrate operation and programming of PLC system.

END OF TEXT SECTION 16903

DIVISION 16 - ELECTRICAL
Section 16950 - Testing Electrical Systems

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions on Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.
- B. Contractor shall note that this section shall be considered a Supplement to testing requirements outlined or described in other sections of these specifications.

1.02 WORK INCLUDES

- A. Extent of Work as required by the Drawings and these Specifications.

1.03 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 16010 - General Electrical Requirements.
 - 2. Section 16123 - Building Wire and Cable.
 - 3. Section 16141 - Wiring Devices.
 - 4. Section 16160 - Cabinets and Enclosures
 - 5. Section 16170 - Grounding and Bonding.
 - 6. Section 16185 - Mechanical Equipment Wiring
 - 7. Section 16441 - Enclosed Switches.
 - 8. Section 16470 - Panelboards.
 - 9. Section 16510 - Luminaires
 - 10. Section 16671 - Transient Voltage Surge Suppression (TVSS)
 - 11. Section 16902 - Electric Controls and Relays

1.04 QUALITY ASSURANCE

- A. Regulatory requirements:
 - 1. Governing codes:
 - a. NFPA 70 - National Electrical Code (most current issue).

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
 - 1. Test Reports:

- a. Test of entire electrical system as noted herein. Submit to the Engineer in triplicate.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Furnish all equipment, tools, manpower, and labor to perform specified testing.

PART 3 EXECUTION

3.01 TESTING

- A. After wires and cables are in place and connected to devices and equipment, the system shall be tested for short circuits, improper grounds, and other faults. When fault condition is present, the trouble shall be rectified, then re-tested. Where cable is found defective or damaged, it shall be removed and replaced in entirety, do not field repair. Cost for correction shall be considered incidental to the project.
- B. Voltage test shall be made at each lighting and distribution panel. When potential is not within 2 percent of rated voltage, the conditions shall be corrected by tap changes or power company correction of line voltage.
- C. Voltage test shall be made between Neutral (White) and Ground (Green) conductors and/or busbar at each lighting and distribution panel. Measured volts shall not exceed 0.2 mV. Locations exceeding this value shall be corrected and re-tested.
- D. A voltage test shall be made on the last outlet of each circuit and the potential drop shall not exceed 3 percent of rated voltage.
- E. All wiring devices and electrical apparatus furnished under this contract, when ground or shorted on any integral "live" part, shall be removed and the trouble rectified by replacing all defective parts and materials. Cost of correction is considered incidental to the project.
- F. All feeder cables, Motor Control Centers (MCC's), Switchboards, Panelboards, Transformers and other power distribution apparatus shall have a Megger resistance test conducted to determine that insulation resistance is not less than that recommended by the manufacturer, or as noted below.

Unless otherwise recommended by the manufacturer, insulation resistance testing shall meet or exceed the following on 600 Volt equipment utilizing 500 Volt resistance test instrument:

Conductors50 Meg-Ohms

Motors.....	5 Meg-Ohms
Switchboards, MCC's and Panelboards	25 Meg-Ohms
Power Transformers	5 Meg-Ohms

- G. Contractor shall furnish all tests and shall provide all test equipment, meters, instruments, cable connections or apparatus necessary for performing tests as specified herein. All costs for testing shall be considered incidental to this item and will not be paid for separately.
- H. Examine connections to equipment for proper phase relationships. Rotate phase conductors as necessary in order to correct.
- I. All motors shall be tested under Article 16220. All motors shall be tested for correct direction of rotation. Run tests on all motors and verify that proper overload devices have been installed. Coordinate this task with motor supplier.
- J. Testing of Ground System
 - 1. Each and all grounded cases and metal parts associated with electrical equipment shall be tested for continuity of connection with the ground bus system by the Contractor in the presence of the Engineer or his representative.
 - 2. All grounding electrode conductors brought in from the ground field shall be tested for satisfactory continuity and by resistance measurement between the electrical equipment ground bus and the ground field. The grounding path shall not exceed 0.010 ohms.
 - 3. Each Ground Field shall be tested for resistance to earth a "three-terminal" or "fall-of-potential" test as described in IEEE Standard #81. As an alternate, a specially designed clamp-on instrument such as AEMC Model 3710 or 3730 may be used if found acceptable to the engineer. Based upon measured field data, the Contractor shall calculate the ground field resistance and furnish record copies to the Engineer and Owner for record. In no case shall the ground field resistance exceed 25 ohms. If the resistance is found to be higher than 25 ohms, one additional rod shall be driven with a minimum separation equal to the length of the ground rod used and connected in parallel with the rod under test.
 - 4. Exterior ground field resistance testing shall not be measured during unusually wet weather and should be performed during normal weather and soil conditions. Any tests incorrectly performed or not performed to the satisfaction of the engineer will be repeated. Costs for all such re-testing shall be considered incidental to the project.

- 5. All specified maximums and minimums of this specifications must be met. Complete test records of all tests shall be made and shall show resistance values obtained and calculations of same, showing method of test and calculation.

- K. Fire alarm equipment testing and certification shall be performed by the Alarm company representative and installing Contractor in the presence of the Owner, Engineer and any Fire Protection Authority as applicable. Correct any deficiencies found and re-test. Copies of all test results are to be forwarded to the Engineer for record. Costs for all such testing are considered incidental to the project.

3.03 CORRECTION OF DEFECTS

- A. When tests disclose any unsatisfactory workmanship or equipment furnished under this contract, correct defects and retest. Repeat tests until satisfactory results are obtained.

- B. When any wiring or equipment is damaged by tests, repair or replace such wiring or equipment. Test repaired items to ensure satisfactory operation.

END OF SECTION 16950

IDA POLICY MEMORANDUMS

**State of Illinois
Department of Transportation
Bureau of Materials and Physical Research**

POLICY MEMORANDUM

January 15, 2004	Springfield	04-03
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TO: DISTRICT ENGINEERS, HIGHWAY BUREAU CHIEFS, AND
MANUFACTURERS AND SUPPLIERS OF FINELY DIVIDED MINERALS

SUBJECT: ACCEPTANCE PROCEDURE FOR FINELY DIVIDED MINERALS USED
IN PORTLAND CEMENT CONCRETE AND OTHER APPLICATIONS

DEFINITIONS

Department - Illinois Department of Transportation.

Bureau - Bureau of Materials and Physical Research, at 126 East Ash Street, Springfield, Illinois 62704-4766.

Finely Divided Mineral - A finely divided material which has cementitious or pozzolanic properties. Examples are fly ash, microsilica (silica fume), ground granulated blast-furnace (GGBF) slag, and high-reactivity metakaolin (HRM).

Manufacturer - A company that manufactures a finely divided mineral. The term Producer is also used.

Supplier - A company that supplies a finely divided mineral which it does not manufacture.

Source - The name and location of the manufacturing process from which the finely divided mineral is obtained.

Approved Source - A source that is approved by the Bureau to ship a finely divided mineral for immediate use on Department projects.

Unapproved Source - A source that ships a finely divided mineral which must be sampled, tested, and approved by the Bureau before it is used on Department projects.

Cement - Portland cement.

Fly Ash - A finely divided residue that results from the combustion of ground or powdered coal, transported from the combustion chamber by exhaust gas, collected by mechanical or electrical means, and stored in stockpiles or bins.

Microsilica - An amorphous silica of high silica content and purity possessing high pozzolanic activity.

Ground Granulated Blast-Furnace (GGBF) Slag - A glassy granular material, formed when molten blast-furnace slag is rapidly chilled, and then finely ground.

High-Reactivity Metakaolin (HRM) - A reactive aluminosilicate pozzolan formed by calcining purified kaolinite at a specific temperature range.

Reference Material - A portland cement used for the control mortar and corresponding test mortars, of a finely divided mineral, to determine its strength activity index.

Preliminary (PRE) Sample - A sample used to determine, in advance, if the finely divided mineral will comply with Department specifications.

Process Control (PRO) Sample - A sample used for the purpose of controlling production of finely divided minerals proposed for incorporation into Department projects.

Acceptance (ACC) Sample - A sample used for accepting/rejecting finely divided minerals prior to its use on Department projects and/or unassigned stock for future use on projects. The quantity represented by acceptance samples must be given.

Independent Assurance (IND) Sample - A sample used to provide an independent check on the reliability of the manufacturer's quality control program.

Investigation (INV) Sample - A destination sample used to verify the acceptability of a finely divided mineral from a source.

Grab Sample - A sample secured from a conveyor, from bulk storage, or from a bulk shipment in one operation.

Composite Sample - Combined grab samples taken at prescribed intervals over a period of time.

NIST - National Institute of Standards and Technology.

CCRL - Cement and Concrete Reference Laboratory.

ISO 9000 Series - A program of international quality management system standards developed by the International Organization for Standardization (ISO).

1.0 PURPOSE

To establish procedures whereby materials of mineral origin, furnished by a **Manufacturer** or **Supplier**, will be accepted for use on **Department** projects.

2.0 SCOPE

This procedure is available to all **Manufacturers** or **Suppliers** of domestic and foreign **Finely Divided Minerals**. **Sources** in North America may be **Approved** or **Unapproved**. **Sources** located outside of North American will not be given **Approved Source** status, and the procedures in Sections 5.1 and 5.3 shall apply.

3.0 SPECIFICATION REQUIREMENTS, SAMPLING, AND TEST PROCEDURES

- 3.1 **Finely Divided Minerals** used on **Department** projects shall meet the material requirements of the **Department's** "Standard Specifications for Road and Bridge Construction", dated January 1, 1997, and current special provisions.
- 3.2 **Fly Ash** used on **Department** projects shall meet the standard physical and chemical requirements of AASHTO M 295, "Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete," for Class C or Class F. A limitation of available alkalis, as Na₂O, of 1.5%, shall apply to fly ashes used in portland cement concrete mixtures and cement aggregate mixture II containing alkali-sensitive aggregates or admixtures.
- 3.3 **GGBF Slag** used on **Department** projects shall meet the standard physical and chemical requirements of AASHTO M 302, "Ground Iron Blast-Furnace Slag for Use in Concrete and Mortars," for a Grade 100 or a Grade 120 material.
- 3.4 **Microsilica** used on **Department** projects shall meet the standard physical and chemical requirements of AASHTO M 307, "Microsilica for Use in Concrete and Mortar," except that the Strength Activity Index requirement shall not apply. The **Microsilica** shall meet the "Accelerated pozzolanic activity index: With portland cement at 7 days," as specified by ASTM C 1240, "Standard Specification for Silica Fume for Use as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout." A limitation of available alkalis, as Na₂O, of 1.5% shall apply to **Microsilica** used in mixtures containing alkali-sensitive aggregates or admixtures.

- 3.5 **High-Reactivity Metakaolin (HRM)** used on **Department** projects shall meet the standard physical and chemical requirements of AASHTO M 295, "Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete," for Mineral Admixture Class N, except that the Strength Activity Index requirement shall not apply. The **HRM** shall meet the "Accelerated pozzolanic activity index: With portland cement at 7 days," as specified by ASTM C 1240, "Standard Specification for Silica Fume for Use as a Mineral Admixture in Hydraulic Cement Concrete, Mortar, and Grout." A limitation of available alkalis, as Na₂O, of 1.5%, shall apply to **HRM** used in mixtures containing alkali-sensitive aggregates or admixtures.

4.0 APPROVED SOURCE PROCEDURE

- 4.1 A **Manufacturer** or **Supplier** requesting **Source** approval of a **Finely Divided Mineral** shall provide the following to the **Bureau**:

- (1) The **Manufacturer's** or **Supplier's** name and location.
- (2) The **Source** name, location (station), and number of generating units.
- (3) The name of the **Finely Divided Mineral** and its class or grade.
- (4) A certification that the **Finely Divided Mineral** meets the applicable requirements of Section 3.0.
- (5) A 6-month testing history.
- (6) A copy of the **Manufacturer's** or **Supplier's** quality control program.
- (7) A copy of the last **CCRL** inspection report of the testing laboratory used by the **Manufacturer** or **Supplier** of the **Finely Divided Mineral**, with documentation of resolution of any discrepancies noted therein. The **Manufacturer** or **Supplier** of **HRM** or **Microsilica** shall provide a copy of the testing laboratory's **CCRL** inspection report and/or an **ISO 9000 Series** certificate.
- (8) A copy of the Material Safety Data Sheet (MSDS) for the **Finely Divided Mineral**.

At the time of application, the **Manufacturer** or **Supplier** shall obtain a **Preliminary (PRE) Grab Sample** of the **Finely Divided Mineral** from current production. The **Manufacturer** or **Supplier** shall split the **PRE Sample** and place one portion in an airtight container and deliver it to the **Bureau**. A sample of the **Reference Material** used by the **Manufacturer** or **Supplier** for testing shall be included. The **Manufacturer** or **Supplier** shall assume the cost to deliver the samples to the **Bureau**. The size of the **Bureau's** portion of the **PRE Sample**, and the **Reference Material**, shall not be less than 3 kg (6 lb.) each and the samples shall be properly identified as required in Attachment 1. The **Manufacturer** or **Supplier** shall test the retained portion of the **PRE Sample** for

the standard physical and chemical properties listed in the applicable specification in Section 3.0 and deliver a copy of the test results to the **Bureau** for comparison.

The **Bureau** will test its portion of the **PRE Grab Sample** for conformance to Section 3.0. The **Bureau** will compare the results obtained by both laboratories to determine compliance with the allowable difference between two laboratories set forth in the precision statement of each test method. Additional split sample testing will be required if the test results obtained on the **PRE Grab Sample** do not comply with the specification requirements of this policy memorandum.

An inspector from the **Bureau** may conduct a scheduled visit to inspect the laboratory facilities designated by the **Manufacturer** or **Supplier** to test the **Finely Divided Mineral**; the **Source** manufacturing process, the **Source** storage facilities; and the quality control policies, procedures, and practices used by the **Manufacturer** or **Supplier**. The **Manufacturer** or **Supplier** shall be responsible for payment of transportation, per diem (meals), lodging, and incidental travel costs incurred by the **Department**.

The **Bureau** will notify the **Manufacturer** or **Supplier**, in writing, if the request for **Approved Source** status is granted or denied. A request may be denied if the **Manufacturer** or **Supplier** fails to meet the requirements of this policy memorandum, or for other reasons determined by the **Department**.

4.2 Quality Control Requirements For **Approved Sources**:

The **Manufacturer** or **Supplier** shall establish and maintain quality control policies and procedures for sampling and testing that are approved by the **Bureau**. The **Bureau** shall be notified of any changes in the **Manufacturer's** or **Supplier's** quality control program.

Testing laboratories used by the **Manufacturers** or **Suppliers** of **Fly Ash** or **GGBF Slag** shall participate in the **CCRL** pozzolan program of the **NIST**, which includes inspection of facilities and testing of comparative samples. Testing laboratories used by the **Manufacturers** or **Suppliers** of **Microsilica** or **HRM** shall participate in the **CCRL** pozzolan program of the **NIST** and/or shall have implemented a quality management system based on the **ISO 9000 Series** standards.

4.3 Reporting Requirements For **Approved Sources**:

The **Manufacturer** or **Supplier** shall deliver a test report to the **Bureau** each month listing the results of all **Grab** and **Composite Samples** taken and tested for the month. Sampling, testing, and reporting shall be done according to the applicable specification in Section 3.0.

4.4 Record Requirements For **Approved Sources**:

Records of production control tests shall be maintained by the **Manufacturer or Supplier** for a minimum period of 5 years, and shall be made available to the **Bureau** upon request.

Copies of bills of lading of quantities of **Finely Divided Minerals** shipped shall be maintained by the **Manufacturer or Supplier** for a minimum period of 3 years, and shall be made available to the **Bureau** upon request.

4.5 Sampling and Test Requirements for **Approved Sources**:

Each January, April, July, and October (unless otherwise specified by the **Bureau**) the **Manufacturer or Supplier** shall obtain a **Process Control (PRO) Grab Sample** of the **Finely Divided Mineral**, which shall be split for testing by the **Manufacturer or Supplier** and the **Bureau**. At this time, a sample of the current **Reference Material** used by the **Manufacturer or Supplier** for testing shall also be split. The **Bureau** samples shall be placed in airtight containers, properly identified as required in Attachment 2, and immediately delivered to the **Bureau**. Each **Finely Divided Mineral** sample and **Reference Material** sample shall not be less than 3 kg (6 lb).

The **Manufacturer or Supplier** shall test the retained portion of each **PRO Sample**, using the retained portion of the **Reference Material**, for the standard physical and chemical properties listed in the applicable specification in Section 3.0. When all tests are completed, the **Manufacturer or Supplier** shall record the test results on a report form that identifies the sample as a **PRO Sample**, and promptly deliver the report to the **Bureau**.

The test results obtained by the **Manufacturer or Supplier** and the **Bureau** on all split samples will be compared for compliance with the allowable differences for two laboratories set forth in the precision statement of each test method and for compliance with Section 3.0. If significant differences exist in the split sample test results, the **Department** will investigate sampling and test procedures, or require additional comparative sampling to determine the cause of the variation.

4.6 **Department** Inspections of **Approved Sources**:

An inspector from the **Bureau** may conduct unscheduled visits, at **Department** expense, to each **Approved Source** or one of its terminals. During this visit, the inspector will either take or witness the taking of a random **Independent Assurance (IND) Grab Sample**. The inspector will split the sample and deliver an equal portion to the **Manufacturer or Supplier**. The **Manufacturer or Supplier** shall test the retained portion of the split sample for the standard physical and chemical properties listed in the applicable specification and deliver the test results to the **Bureau**, as specified in Section 4.5, for comparison and compliance with Section 3.0.

Random **Investigation (INV) Samples** of the **Finely Divided Minerals** and the project **Cement** will be obtained at final destination by a representative of the **Department**. The representative will either take or witness the taking of the **INV Samples**. **INV Samples** will be **Grab Samples** and shall not be less than 3 kg (6 lb). (Note: **Cement** samples will be taken according to ASTM C 183). The sampling location and frequency for obtaining **INV Samples** will be determined by the **Bureau** in consultation with the district offices.

The **Bureau** will test **INV Samples** to ascertain the results of **Finely Divided Mineral-project Cement** combinations. To verify that **Finely Divided Minerals** shipped from **Approved Sources** meet the requirements of Section 3.0, the **Bureau** will test **INV Samples** with the appropriate **Reference Material**.

4.7 Revocation of **Approved Source** Status:

Failure of a **Manufacturer** or **Supplier** to meet the requirements of Sections 3.0 and 4.0 of this policy memorandum will be sufficient cause to revoke **Approved Source** status.

Failure to resolve significant differences in testing, as indicated by the test results obtained on **PRO** or **IND Samples** split with the **Manufacturer** or **Supplier** will be sufficient cause to revoke **Approved Source** status.

Failure of the testing laboratory, used by the **Manufacturer** or **Supplier** of a **Finely Divided Material**, to satisfactorily resolve the discrepancies noted in the **CCRL** inspection report and/or to maintain a quality management system based on the **ISO 9000 Series** will be sufficient cause to revoke **Approved Source** status.

Revocation of **Approved Source** status will be reported to the **Manufacturer** or **Supplier** in writing. The **Manufacturer** or **Supplier** may not re-apply for **Approved Source** status until 30 days have elapsed from the date of the written notice of revocation.

5.0 UNAPPROVED SOURCE PROCEDURE

5.1 A **Manufacturer** or **Supplier** requesting approval of a **Finely Divided Mineral** from an **Unapproved Source** shall provide the following to the **Bureau**:

- (1) The **Manufacturer's** or **Supplier's** name and location.
- (2) The **Source** name, location (station), and number of generating units.
- (3) The name of the **Finely Divided Mineral** and its class or grade.

- (4) A current test report, in English, which indicates the standard physical and chemical composition of the **Finely Divided Mineral** as per Section 3.0.
- (5) The transportation method and location at which an inspector from the **Bureau** will be able to obtain **Acceptance (ACC) Samples**.
- (6) If requested by the **Bureau**, the **Manufacturer** or **Supplier** shall deliver to the **Bureau** a 24-hr **Composite Preliminary (PRE) Sample** of the **Finely Divided Mineral** from current shipments. The **Manufacturer** or **Supplier** shall assume the cost to deliver it to the **Bureau**. The size of the **PRE Sample** shall not be less than 3 kg (6 lb) and the sample shall be properly identified as required in Attachment 1.

5.2 Sampling and Test Requirements for **Unapproved Sources** in North America:

- (1) **Finely Divided Minerals** from an **Unapproved Source** will be sampled, tested, and approved by the **Bureau** before use on **Department** projects. The **Bureau** has the option to affix a seal to secure **Finely Divided Minerals** in storage (e.g. silo, truck, railroad car, or barge) until the **Bureau's** testing is completed.
- (2) Upon arrival of the **Finely Divided Mineral** to Illinois, an inspector from the **Bureau** will obtain **Acceptance (ACC) Grab Samples** according to the applicable specifications. The **Bureau** will determine the number of representative samples required.
- (3) The **Manufacturer** or **Supplier** may request the **Bureau** to sample the **Finely Divided Mineral** prior to arrival in Illinois. In the event the request is approved, the **Manufacturer** or **Supplier** shall be responsible for payment of transportation, per diem (meals), lodging, and incidental travel costs incurred by the **Department** inspector. If the **Department** determines that it lacks the resources to accomplish out-of-state inspection, the **Finely Divided Mineral** may be sampled and tested according to the procedures in Section 5.3.
- (4) **Acceptance (ACC) Samples** will be tested by the **Bureau** for conformance to Section 3.0, and to approve the **Finely Divided Mineral** for use on **Department** projects.
- (5) **Random Investigation (INV) Samples** of **Finely Divided Minerals** may be obtained at final destination by a representative of the **Department**. The representative will either take or witness the taking of the **INV Samples**. **INV Samples** will be **Grab Samples** and will be taken according to the applicable specification. The sampling location and frequency for obtaining **INV Samples** will be determined by the **Bureau** in consultation with the district offices. The **Bureau** will use **INV Samples** to verify that the **Finely Divided Mineral** shipped meets the requirements of Section 3.0.

5.3 Sampling and Test Requirements for **Unapproved Sources** Located Outside North America:

An agent of the importer shall obtain an **Independent Assurance (IND) Grab Sample** from each barge of foreign **Finely Divided Mineral** loaded at the port of entry and destined for Illinois.

The agent shall split each barge **Grab Sample** and mail one portion to the **Bureau**. The other portion shall be mailed to the importer's testing laboratory that is approved by the **Department**. The importer of the **Finely Divided Mineral** shall be responsible for all sampling and mailing costs.

The importer's laboratory shall test its portion of each barge **Grab Sample** for the standard physical requirements of the applicable specifications. One random barge **Grab Sample**, representing the **Finely Divided Mineral** in each hold of the vessel shall be tested for chemical composition.

Upon completion of the tests, the importer shall deliver to the **Bureau** a certification that states the **Finely Divided Mineral** in the vessel unloaded at the port of entry has been tested by the importer, and complies with the applicable specifications. Attached to the certification shall be a test report of all barge samples. The report shall include the name of the vessel, the source of the **Finely Divided Mineral**, the barge number, the hold number, the date the sample was taken, the quantity of **Finely Divided Mineral** in the barge, and the physical and chemical test results obtained on the samples.

The importer shall immediately notify the **Bureau** if a barge sample fails to meet the applicable specification requirements.

The **Bureau** will review the certification and compare the importer's test data to the test data obtained by the **Bureau** on its portion of each split sample.

When the certification and the accompanying test report are examined and determined to be correct, the **Bureau** will notify the importer and the district offices that the **Finely Divided Mineral** is approved for state projects.

Random Investigation (INV) Samples, from one or more barges, may be taken by a **Department** inspector when the barges arrive at the Illinois terminal(s).

The **Department** will reject any foreign **Finely Divided Mineral** tested by the **Bureau**, or the importer, that does not meet the specification requirements. The **Department** may reject any barge of **Finely Divided Mineral** wherein the differences in test values, obtained by the **Department** and the importer on the split sample, exceeds the multilaboratory precision of the test method, but the **Finely Divided Mineral** is within specifications.

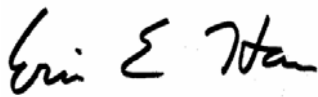
Alternative proposals to the sampling and test requirements stated in this section will be considered for **Finely Divided Minerals** which have an acceptable quality history, and which have previously been approved by the **Department**. Requests shall be directed to the **Bureau of Materials and Physical Research** for approval.

6.0 ACCEPTANCE OF FINELY DIVIDED MINERALS

- 6.1 **Finely Divided Minerals** will be accepted according to the **Department's** current "Standard Specifications for Road and Bridge Construction," current special provisions, and this policy memorandum.
- 6.2 The **Bureau** will maintain and circulate a current list of **Approved Sources of Finely Divided Minerals** which meet the requirements of this policy memorandum. This list will include the name, location, and Producer/Supplier Number of each approved **Manufacturer** or **Supplier** of **Finely Divided Minerals**. These **Manufacturers** or **Suppliers** may ship **Finely Divided Minerals** for immediate use on **Department** projects.
- 6.3 **Finely Divided Minerals** from **Unapproved Sources** will be approved by the **Bureau** before use on **Department** projects.

7.0 REJECTION OF FINELY DIVIDED MINERALS

- 7.1 A **Finely Divided Mineral** that fails to conform to the requirements of Section 3.0 of this policy memorandum shall be rejected for use on **Department** projects.
- 7.2 The **Bureau** will notify the **Manufacturer** or **Supplier** when a **Finely Divided Mineral** is rejected for use on **Department** projects.



Eric E. Harm, P.E.
Engineer of Materials
and Physical Research

Attachments

This policy memorandum supersedes Policy Memorandum 99-5 dated April 1, 1999.

DAD/dsg

PRE SAMPLE IDENTIFICATION

MEMO TO: Illinois Department of Transportation
Bureau of Materials and Physical Research

SUBJECT: Preliminary (PRE) Sample

DATE: _____

The enclosed Preliminary (PRE) Sample is submitted to the Bureau of Materials and Physical Research for testing:

This PRE Sample is identified as follows:

1. Manufacturer/Supplier Name: _____
2. Material Name (i.e. Fly Ash, GGBF Slag, etc.): _____
3. Material Class or Grade: _____
4. Name and Location of Source of Material: _____

5. Date Sample Was Taken: _____
6. Identification Number (If Used): _____
7. Sample Taken From (i.e. Truck, Silo, etc.): _____
8. Remarks: _____

Instructions: Include this sample identification sheet with each PRE Sample and mail to:

Illinois Department of Transportation
Bureau of Materials and Physical Research
126 East Ash Street
Springfield, Illinois 62704-4766
ATTN: J. R. Oglesby, Cement Technology Engineer

PRO SAMPLE IDENTIFICATION

MEMO TO: Illinois Department of Transportation
Bureau of Materials and Physical Research

SUBJECT: Process Control (PRO) Sample

DATE: _____

The enclosed Process Control (PRO) Sample is submitted to the Bureau of Materials and Physical Research for testing:

This PRO Sample is identified as follows:

1. Manufacturer/Supplier Name: _____
2. Material Name (i.e. Fly Ash, GGBF Slag, etc.): _____
3. Material Class or Grade: _____
4. Name and Location of Source of Material: _____

5. Date Sample Was Taken: _____
6. Identification Number (If Used): _____
7. Sample Taken From (i.e. Truck, Silo, etc.): _____
8. Remarks: _____

Instructions: Include this sample identification sheet with each PRO Sample and mail to:

Illinois Department of Transportation
Bureau of Materials and Physical Research
126 East Ash Street
Springfield, Illinois 62704-4766
ATTN: J. R. Oglesby, Cement Technology Engineer

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004

Springfield

Number: 87-2

TO: CONSULTING ENGINEERS

SUBJECT: DENSITY ACCEPTANCE OF BITUMINOUS PAVEMENTS

I. Introduction

This Policy Memorandum deals with the implementation of the Bituminous Density Quality Assurance specifications as a revision to the Standard Specification for Construction of Airports, January 1985. These revisions are to Item 201 Bituminous Base Course, and Item 401 Bituminous Surface Course.

II. Sampling

After completion of compaction and the pavement has reached ambient temperature, the paved area shall be divided into Sublots of 500 tons per type of mix. One core sample (2 cores per sample) shall be taken from each Sublot. The longitudinal and transverse location for each sample shall be determined by use of a random number "Deck" provided by the Division. No core shall be taken closer than two (2) feet from the edge of the mat. A core extraction device as illustrated by the attachment is recommended. All cores are to be taken by the contractor under the supervision and remain in the possession of the engineer. It is imperative that the Engineer and the contractor realize that the cores are "Money" and that improper coring, extraction, shipping and/or testing can be costly.

One mix sample per 1000 tons of mix laid shall be taken for Extraction, Maximum Specific Gravity (G_{mm}) and Air Void tests. The mix samples shall be sampled by the contractor and split in half.

The Resident Engineer shall randomly designate and send the split samples to an independent laboratory for testing. The laboratory will be designated by the Division of Aeronautics. The frequency of testing split samples shall be 1 per 5000 tons. Higher frequencies may be necessary if the contractor's tests, and/or mix quality control are inconsistent.

III. Testing

All cores shall be tested for Bulk Specific Gravity (G_{sb}) in accordance with ASTM D2726 using Procedure 9.1, "For Specimens That Contain Moisture". The Theoretical Maximum Gravity (G_{mm}) shall be determined according to ASTM D2041, Procedure 7. From these tests the in-place air voids of the compacted pavement are calculated according to ASTM D3203 for "dense bituminous paving mixtures". Selection of the proper G_{mm} shall be based on a running average of four (4) tests per Lot.

- Eg. Lot 1 - Use the average of the two (2) tests for Lot 1.
Lot 2 - Use the average of the four (4) tests from Lots 1 and 2.
Lot 3 - Use the average of the four (4) tests from Lots 2 and 3.

NOTE: When more than four (4) Sublots are used, still use a running average of four (4) tests per Lot.

IV. Acceptance Calculations

The first step in calculating the quantities for pay is to calculate the Mean (\bar{x}) and the Standard Deviation (S) of the Sublot tests. From this data the Lot samples should first be tested for outliers. After consideration for outliers, the Percent Within Tolerance (PWT) and the Percent Within Limits (PWL) are calculated to determine the final pay quantities for the Lot.

EXAMPLE

1. Test Data

Lot Quantity = 2000 tons
Sublot Test 1 = 4.35 % Air
Sublot Test 2 = 3.96 % Air
Sublot Test 3 = 6.75 % Air
Sublot Test 4 = 6.25 % Air

2. Calculating the Mean and Standard Deviation

Sublot	\underline{x}	$(\underline{x} - \bar{x})$	$(\underline{x} - \bar{x})^2$
1	4.35	- 0.978	0.956
2	3.96	- 1.368	1.871
3	6.75	1.422	2.022
4	<u>6.25</u>	0.922	<u>0.850</u>
Sum =	21.31		5.699

$$N = 4$$

$$\text{Mean}(\bar{x}) = 5.328$$

$$\text{Variance } (S)^2 = \frac{\text{Sum}(x - \bar{x})^2}{3} = \frac{5.699}{3} = 1.900$$

$$\text{Standard Deviation } S = \sqrt{1.900} = 1.378$$

3. Test For Outliers

Check for Critical "T" Values

$$T = \frac{|(x_1 - \bar{x})|}{S} = \frac{|3.96 - 5.328|}{1.378} = 0.99$$

* Difference between the suspect test value (x_1) and the Mean (\bar{x}).

If the T value exceeds the critical "T" Value in the table below and no assignable cause can be determined for the outlier, discard the suspected test measurement and obtain another random sample from the Lot in question. If the new test exceeds the Mean (\bar{x}) in the same direction from the Mean as the suspected test, recalculate the T value including all tests (original test, suspected test, and new test) for an outlier and for computing final payment.

TABLE OF CRITICAL "T" VALUES

Number of observations (N)	Critical "T" Value <u>5% Significance Level</u>
3	1.15
4	1.46
5	1.67
6	1.82
7	1.94
8	2.03
9	2.11
10	2.18
11	2.23
12	2.29

Based on the above table, the "T" value of 0.99 does not exceed the Critical "T" Value of 1.46 for N = 4. Therefore, the value (3.96) is not an outlier and shall be used in calculating the Lot payment.

4. Calculation of Lot Payment

To calculate the Lot Payment use the Acceptance Criteria as outlined under Item 201-4.13(c) or Item 401-4.13(c).

$$Q_L = \frac{(\bar{x} - 1)}{S} = \frac{5.328 - 1}{1.378} = 3.141$$

$$Q_u = \frac{(7 - \bar{X})}{S} = \frac{7-5.328}{1.378} = 1.213$$

From this data the Percentage Within Tolerance (PWT) for both the lower and upper tolerance limits is determined by Table 8 of the specifications for the number (N) of samples tested.

$$\begin{aligned} \text{Eq. PWT (lower)} &= 99.0\% \\ \text{PWT (upper)} &= 90.4\% \end{aligned}$$

We now calculate the Percent Within Limits (PWL) for the Lot.

$$\begin{aligned} \text{PWL} &= [\text{PWT (lower)}] + [\text{PWT (upper)}] - 100 \\ \text{PWL} &= (99.0 + 90.4) - 100 = 89.4\% \end{aligned}$$

Using Table 7, the % Adjustment in Lot Quantity is:

$$\begin{aligned} \% \text{ Adjustment} &= 0.5 \text{ PWL} + 55.0 \\ \% \text{ Adjustment} &= 0.5 (89.4) + 55.0 \\ \% \text{ Adjustment} &= 99.7 \end{aligned}$$

$$\begin{aligned} \text{Adjusted Quantities} &= \% \text{ Adjustment} \times \text{Lot Quantities} \\ \text{Adjusted Quantities} &= .997 \times 2000 \text{ tons} \\ \text{Adjusted Quantities} &= 1994 \text{ tons} \end{aligned}$$

5. Resampling and Retesting

Under the specifications the contractor has the right to request the resampling and retesting of a complete Lot. This privilege is only allowed once for each Lot and must be requested in writing by the contractor within 48 hours of receiving the official report from the Engineer.

6. Reporting

After completion of the tests for each Lot, the Engineer shall complete the necessary calculations for final adjustment in quantities on the Form AER M-1 and have both the Engineer and the Contractor sign the report for copying to both the FAA and IDOA.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 87-2, dated January 1, 1999.

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

July 31, 2004

Springfield

Number: **87-3**

TO: CONSULTING ENGINEERS

SUBJECT: MIX DESIGN, TEST BATCH, QUALITY CONTROL, AND ACCEPTANCE
TESTING OF PCC PAVEMENT MIXTURE

I. SCOPE

This Policy Memorandum addresses the Mix Design, Test Batch, Quality Control and Acceptance Testing of PCC pavement mixtures specified by Item 501, Portland Cement Concrete Pavement, in accordance with the Standard Specifications for Construction of Airports, effective January 1985, Special Provisions, and policies of the Division of Aeronautics.

II. MIX DESIGN

Prior to the start of paving operations and after approval by the Division of Aeronautics (IDOA) of all materials to be used in the manufacture of the concrete, the contractor shall provide a preliminary mix design(s) for evaluation at the Test Batch. The mix design shall indicate saturated surface dry batch weights per cubic yard for each material component. In addition, each material component, including chemical admixtures, shall be identified by the IDOT material code number, the IDOT producer code number, and the producer name and location. Saturated surface dry and oven dry specific gravities, as well as absorption values, for each proposed aggregate to be used in the mix shall be indicated on the mix design. When requested in writing by the contractor, the Engineer will recommend a preliminary mix design for evaluation at the Test Batch.

The Mix Design and the contractor's approved Job Mix Formula (JMF) will be issued by our office subject to verification of the mix by strength tests obtained from mix prepared from a Test Batch(es) according to the approved JMF. The water-cementitious ratio established from the approved test batch is the maximum water-cementitious ratio allowed during production paving. Whether the contractor selects his own mix design or chooses to use the mix design recommended by the Division, the contractor is responsible for the mix design, as well as the manufacture and placement of the mix.

III. TEST BATCH

At least 28 days prior to the start of production, the contractor and/or producer shall prepare a Test Batch under the direction of the Engineer. The Test Batch shall be prepared at the concrete plant proposed for use in the production of the concrete mix for the project and shall be in accordance with the approved Job Mix Formula (JMF). When approved by the Engineer, the Test Batch may be prepared at a different plant provided that the same materials specified in the JMF are used. The plant shall have been

surveyed and approved by the Engineer prior to preparation of the Test Batch. As required by these Special Provisions, the contractor shall provide Quality Control for production of the concrete. The contractor shall have his Quality Control Manager and a representative of the contractor familiar with the paving operation, present at the Test Batch preparation. The Test Batch shall be prepared as follows:

A. Proportioning

Prior to preparation of the mix, the Proportioning Technician shall perform a minimum of two (2) gradation analysis and two (2) moisture tests on each aggregate used. The gradation analysis shall be reported on form AER M-12, Side 1. From this data, the JMF shall be adjusted for moisture, in accordance with form AER M-12, Side 2. A microwave type moisture probe (or equal) may be allowed to adjust proportions for sand moisture when approved by the Engineer.

B. Preparation of the Mix:

- 1.) Prepare a Test Batch that is at least one-half (1/2) the manufacturer's rated capacity of the mixing drum (in cubic yards). The Test Batch shall be prepared with the approved JMF, adjusted for moisture.
- 2.) Mixing requirements shall be:
 - a.) Central Mix Plant: Mixing time shall be a minimum of 90 seconds. If transit mixer trucks are used to transport the mix, the mix shall be agitated, after mixing, at 2-5 RPM for the approximate time anticipated between batching at the plant and deposit of the concrete in the forms. If non-mixing trucks are used to transport the mix, the mix shall remain in the central mixer with no mixing or agitation for the approximate time anticipated from when the water contacts the cement and deposit of the concrete in the forms.
 - b.) Transit Mix Plant: Mixing shall consist of 70-100 Revolutions @ 5-16 RPM. After initial mixing, agitate mix at 2-5 RPM for the approximate time anticipated between batching at the plant and deposit of the concrete in the forms.
- 3.) Slump and Air: If the air content after aging is $6.0\% \pm 1.5\%$ and provides the required workability for paving, the contractor will make cylinders for testing at 3, 7, 14 and 28 days. If the slump is below that required for placement, the contractor may add additional water to increase the slump as necessary up to the maximum water/cement ratio (or water/cementitious material) ratio listed herein. Additional mixing of at least 40 Revolutions will be required with each addition of water. Cylinders and/or beams will be made for testing at 3, 7, 14 and 28 days when the slump is obtained, at $6.0\% \pm 1.5\%$ air content. The water/cement ratio (or water/cementitious material) ratio cannot exceed 0.44 based on actual batch weights when 501-3.6(A) proportions is specified, and 0.42 when 501-3.6(B) proportions is specified.
- 4.) The Proportioning Technician shall complete Form AER M-7, Plastic Concrete Air, Slump and Quantity and Form AER M-6, Concrete Moisture Determination

(Adjusted Oven Dry Method), to be given to the Resident Engineer after completion of the Test Batch. The Flask Method, Dunagan Method, and Pycnometer Jar Method are also acceptable test methods for the determination of aggregate moisture.

- 5.) The Resident Engineer and contractor shall complete Form AER M-4, Concrete Plant Production, Mix Verification.
- 6.) The concrete test cylinders and/or beams shall be tested at 3, 7, 14 and 28 days to establish a growth curve of concrete strength vs. age. The compressive strength shall be at least 800 psi, over the specified strength, at 28 days. Flexural strength concrete shall have at least 100 psi over the specified strength at 28 days.

IV. QUALITY CONTROL

Quality control testing is the responsibility of the contractor and must be performed by qualified testing personnel approved by the Engineer. The proportioning technician shall be PCC Level II certified by the testing firm must perform his or her duties on a full time basis whenever concrete is produced for an IDOA project.

The proportioning technician shall perform the duties as outlined in the Division of Highways latest Manual of Instructions for Concrete Proportioning and Testing and as outlined as follows. These duties as outlined are not necessarily all inclusive and may include other duties as required by the specifications, special provisions, etc.

If a QC or QA test for slump, air content, or mix temperature fails to meet the requirements of the specifications the contractor shall reject the batch. In the case of a failing test of the air content, the contractor may make adjustments to the concrete to bring the air content into compliance with the specification. Adjustments are subject to the time limitations of 1 hour from time of batching when the concrete is transported in mixer trucks. Time limitations shall be increased by 30 minutes when the concrete mixture contains a retarding admixture. When concrete has been rejected due to failing test results, the contractor shall continue to run tests for the failed test parameter until at least 3 consecutive passing tests are achieved. This testing is in addition to the normal QC and QA testing.

A. Duties of the Proportioning Technician:

- 1.) Check and maintain shipment tickets of each material used in the manufacture of the concrete. These tickets are to be given to the Resident Engineer for each day's production of concrete. The aggregates shall indicate the quality on the ticket and a statement that the coarse aggregate is a non "D" cracking (freeze-thaw rated by IDOT) aggregate. In lieu of having these statements on each ticket, the contractor may use the Division's Aggregate Certification of Compliance form, or supply the Resident Engineer with a certification letter indicating the stone quality and statement of non "D" cracking compliance.
- 2.) Inspect and maintain proper storage of all aggregates and materials daily.
- 3.) Perform at least one (1) sieve analysis for each aggregate daily.
- 4.) Inspect all weighing or measuring devices daily.

- 5.) Twice daily check the actual weighing or measuring of aggregates, cement, water, and admixtures for conformance to adjusted batch proportions. Record data on Form AER M-4, Concrete Plant Production, Mix Verification, and calculate the water/cement (or water/cementitious material) ratio.
- 6.) See that the volume of the batch does not exceed the allowable capacity of the mixer and that the proper mixing time is used.
- 7.) Make at least two (2) moisture tests of each aggregate daily and correct batch weights as required.
- 8.) Adjust the dosage rates of the admixtures as required to meet concrete temperature changes and paving conditions.
- 9.) Complete AER M-7, Concrete Air, Slump and Quantity, and Form AER M-4, Concrete Plant Production, Mix Verification for each day's production and deliver same to the Resident Engineer at the end of the day for which the data pertains. Provide to the Resident Engineer load tickets for all aggregates, cement, and admixtures used in the mix.

The Resident Engineer will also be required to visit the plant twice daily on a random basis to record actual batch weights and complete Form AER M-4, Concrete Plant Production, Mix Verification. Forms AER M-4, M-7, and M-12 shall be submitted to the R.E. on a daily basis and then faxed by the R.E. to the Division of Aeronautics daily. (FAX is (217) 785-4533.)

V. ACCEPTANCE TESTING

As required by Item 501-5.3 of the Standard Specifications, acceptance and payment of the final pavement is based on the strength of either cylinders or beams taken at random during the time of construction. The pavement shall be divided into Lots of 1200 cubic yards with sublots of 300 cubic yards each. One random sample (two cylinders or one beam) shall be obtained from each subplot for testing at 28 days to calculate final payment. At the time a subplot sample is taken, one (1) slump and one (1) air test shall be taken.

In addition to the above described sample frequency, three (3), seven (7) and fourteen (14) day tests shall be taken. The Engineer may require additional tests to maintain Quality Control.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 87-3, dated January 1, 2004.

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004

Springfield

Number: **87-4**

TO: CONSULTING ENGINEERS

SUBJECT: DETERMINATION OF BULK SPECIFIC GRAVITY (d)
OF COMPACTED BITUMINOUS MIXES

- A. SCOPE. This method of test covers the determination of the bulk specific gravity and the percent air, of core samples from compacted bituminous mixtures using a saturated surface-dry procedure.
- B. DEFINITIONS.
1. Bulk Specific Gravity (G_{sb}) or density is the weight per unit volume (gms/cc) of a mixture in its existing state of consolidation. The volume measurement for this specific gravity will include the volume of all the aggregate, asphalt, and air spaces (voids) in the aggregate particles and between the aggregate particles.
 2. Theoretical Maximum Specific Gravity (G_{mm}) ASTM 2041 is the weight per unit volume (grams/cc) of a mixture assuming complete consolidation; i.e., all the air spaces (voids) between the aggregate particles are eliminated.
 3. Percent Density is a measure of the degree of compaction in relation to the Theoretical Maximum Specific Gravity.
 4. Percent Air is a measure of the air voids in the compacted pavement.
- C. APPARATUS.
1. Balance - The balance shall be accurate to 0.1 gm throughout the operating range. It may be mechanical or electrical and shall be equipped with a suitable suspension apparatus and holder to permit weighing of the core in water while suspended from the balance. If the balance is a beam type, it shall be set up so that the core is placed in the basket that is suspended from the zero (0) end of the balance arm.
 2. Water bath - The container for immersing the core in water while suspended from the balance shall be equipped with an overflow outlet for maintaining a constant water level. This water bath should be large enough to handle full-depth cores. When testing several cores at the same time, a dish-pan, sink or suitable container may be used for soaking.

D. PROCEDURE.

1. Prior to testing, cores shall be sorted on a flat surface in a cool place. The sample(s) shall be brushed with a wire brush and/or other suitable means, to remove all loose and/or foreign materials, such as seal coat, tack coat, foundation material, soil, paper, and foil, prior to testing.
2. If a core contains binder and surface or multiple lifts, the lifts shall be separated. This may be done in the following manner:
 - a. Mark the separation line between the two lifts.
 - b. Place the core in a freezer for 20-25 minutes.
 - c. Place a 2 or 3-inch wide chisel on the separation line and tap with a hammer. Rotate the core and continue this process until the core separates. Brush loose pieces with a wire brush if needed.
 - d. Allow 2-3 hours for the core to return to ambient temperature before proceeding.
3. Prepare the water baths for soaking and weighing with water at 77^o F. Water baths should be maintained at this temperature throughout testing. Saturate the cores by submerging in the water for a minimum of 20 minutes.
4. With the balance and water bath properly assembled and zeroed, suspend the sample from the balance and submerge it in the water bath. The core must be placed with the original top and bottom in a vertical position. If necessary, add sufficient water to bring the water level up to the overflow outlet. Permit any excess to overflow. Read and record the Saturated Submerged Weight. Designate this weight as (C).
5. Remove the core from the water bath and blot the excess water from the surface of the core with an absorbent cloth or other suitable material. This must be done quickly to prevent the internal water from escaping.
6. Place the core on the balance and read and record the Saturated Surface-dry Weight in air. Designate this weight as (B).
7. Place the core in a tared pan and dry in an oven. When the core is dry, (less than 0.5 gm loss in one hour) record the weight and subtract the pan weight. Designate this weight as (A).

8. The following calculation is used to determine the Bulk Specific Gravity of the core.

$$G_{sb} = \frac{A}{B-C}$$

G_{sb} = Bulk Specific Gravity
A = Oven dry weight
B = Saturated surface-dry weight
C = Saturated submerged weight

- E. PERCENT DENSITY. The following calculation is used to determine the percent density of the core:

$$\% \text{ Density} = 100 \times \frac{G_{sb}}{G_{mm}}$$

G_{sb} = Bulk Specific Gravity
 G_{mm} = Theoretical Maximum Gravity*

Note: The Theoretical Maximum Gravity (G_{mm}) is determined from the mix design until current Vacuum Pycnometer test are available.

- F. PERCENT AIR. To calculate the percent air, use the following formula:

$$\% \text{ Air} = 100 - \% \text{ Density}$$

- G. WEIGHT PER SQUARE YARD OF COMPACTED MIXTURE. The actual weight per square yard of a compacted mixture can be calculated by using the Bulk Specific Gravity (G_{sb}). The volume of a square yard of pavement one (1) inch thick is 0.75 cubic foot. Taking the weight of a cubic foot of water as 62.37 pounds, one square yard of compacted material, one (1) inch thick weighs:

$$\text{Pounds Per Sq. Yd. (1" thick)} = 0.75 \times 62.37 \times G_{sb}$$

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 87-4 effective January 1, 1994.

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004

Springfield

Number: **90-1**

TO: CONSULTING ENGINEERS

SUBJECT: Resampling and Retesting of PCC Pavement

I. PURPOSE

1. This Policy Memorandum outlines the procedure for resampling and retesting of individual Lots of PCC Pavement for the determination of final Price Adjustment as permitted by the Special Provisions for Item 501 Portland Cement Concrete Pavement (Plain and Reinforced).

II. RESAMPLING AND RETESTING.

1. If the contractor should request the resampling and retesting of a LOT, he must notify the Engineer in writing within 24 hours of receiving the written test results and payment results for the LOT in question. The entire LOT must be resampled (no selective resampling of individual sublots will be allowed) and the contractor is not allowed to take additional cores. Once approval to resample has been granted, the Engineer will select random locations from each SUBLOT of the LOT in question and direct the contractor to drill two (2) 4 inch or 6 inch diameter cores from each location. The cores shall be obtained, cured and tested in accordance with ASTM C 42, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete. The Engineer will take possession of the cores once they have been cut by the contractor.

III. CALCULATION FOR PRICE ADJUSTMENT

1. When Compressive Test Specification (501-3.6(A) Proportions) is specified. The two (2) specimens from each SUBLOT shall be averaged to constitute one SUBLOT sample. The Percent Within Limits (PWL) for the LOT shall then be calculated in accordance with Item 501-5.3, Price Adjustment, of the Special Provisions using the sampled core compressive strengths and the Compressive Test formula. The final Price Adjustment shall be based on the PWL calculated using the sampled core compressive strengths. The test results of the resampled pavement are final. All costs associated with resampling, including, but not limited to testing, curing, and coring the concrete samples shall be borne by the contractor, regardless as to whether the test results increase or decrease calculated payment quantity of concrete pavement.
2. When Flexural Test Specification (501-3.6(B) Proportions) is specified. The two (2) specimens from each SUBLOT shall be averaged to constitute one SUBLOT sample. The SUBLOT samples shall then be averaged to obtain a LOT average. In order for the contractor to increase concrete payment quantity back to 100%, the LOT average shall

be at least 6500 psi, and no individual SUBLOT sample shall be less than 6000 psi. Both the LOT average and SUBLOT sample strength requirements must be met in order for the concrete payment quantity to change back to 100%. If both requirements are not met, then the original concrete payment quantity calculated based on the Percent Within Limits (PWL) as outlined in 501-5.3, Price Adjustment, of the Special Provisions shall still apply. The test results of the resampled pavement are final. All costs associated with resampling, including, but not limited to testing, curing, and coring the concrete samples shall be borne by the contractor, regardless as to whether the test results increase or decrease calculated payment quantity of concrete pavement.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 90-1, dated January 1, 2001

**Illinois Department of Transportation
Division of Aeronautics
Materials Section**

POLICY MEMORANDUM

January 1, 2004

Springfield

Number 95-1

TO: CONSULTING ENGINEERS

SUBJECT: FIELD TEST PROCEDURES FOR MIXER PERFORMANCE AND CONCRETE UNIFORMITY TESTS

I. SCOPE

These methods describe the procedures for obtaining and testing representative samples of fresh concrete in the field to determine the consistency and mixer efficiency of stationary mixers at different mixing time periods.

The concrete produced during the mixing time investigation and not used in the test program may be incorporated in the project provided it conforms to the Standard Specifications for Construction of Airports.

A maximum of two mixing times shall be considered by the Department.

The contractor shall provide all of the necessary equipment and personnel to perform the tests and the Department will observe the testing.

II. APPARATUS REQUIRED

- a. Three (3) air meters conforming to the requirements of ASTM C231 or ASTM C173.
- b. Three (3) slump cone kits conforming to ASTM C143.
- c. One (1) No. 4 sieve having a minimum screen area of 2 sq. ft. The sieve shall conform to the requirements of AASHTO M92.
- d. One (1) platform scale graduated in tenths of a pound having a capacity sufficient to perform tests herein after specified.
- e. One (1) hydraulic or mechanical testing machine conforming to the requirements of the specified testing method for the project (ASTM C39 or ASTM C78).

- f. Flexural strength specimen forms as required. The forms shall be nominally 6x6x30 inch. Means shall be provided for securing the base plate firmly to the mold. The inside surfaces of the mold shall be smooth and free from holes, indentations, or ridges. The sides, bottom, and ends shall be at right angles and shall be straight and true so that the specimens will not be warped. Maximum variation from the nominal cross-section shall not exceed 1/8 inch. The assembled mold and base plate shall be lightly coated with mineral oil or other approved form release oil before use. Compressive strength specimens shall be 6x12 inch and prepared in accordance with ASTM C31.
- g. Sufficient water tanks for curing specimens as required by ASTM C31.
- h. Small tools such as shovels, scoops, buckets, etc., and water shall be furnished, as required.

III. MIXER

The mixer for which the mixing time is to be evaluated shall conform to the applicable sections of the Standard Specifications for Construction of Airports.

IV. MIXING TIME REQUIREMENTS

The minimum mixing time to be evaluated shall be specified in the Standard Specifications for Construction of Airports.

V. PROCEDURE

A minimum of ten (10) batches per drum shall be tested and evaluated for each original reduced mixing time request. Check tests shall consist of three (3) batches.

If the request is for a new, twin drum mixer, ten (10) batches shall be tested for the first drum and three (3) for the second drum.

Check tests are required if the mixer is moved, major maintenance performed, or if the source or type of aggregate has changed. A minimum frequency of check tests shall be one (1) per year.

a. Mixing Time

The mixing time and batch size to be evaluated shall be proposed by the contractor. The mixing time shall begin when all solid materials are in the mixing drum. The mixer timer shall register or indicate accurately the mixing time and a tolerance of two (2) seconds will be permitted.

If approved by the Engineer, minor adjustments in admixture dosage and water content will be allowed to account for weather conditions, provided that the maximum w/c ratio is not exceeded.

b. Sampling

At the conclusion of the mixing cycle, the mixer shall be discharged and appropriate samples obtained from the first, middle, and last third portions of the batch. Any appropriate method may be used, provided the samples are representative of the respective portions and not the very ends of the batch.

As an alternative, the mixer may be stopped, and the samples removed by any suitable means at equally spaced points from the front to the back of the drum.

c. Testing.

1. Each third portion of the batch shall be tested simultaneously. The Contractor shall provide sufficient personnel to meet this requirement. The Contractor personnel performing the testing shall be Level I PCC Technicians or Concrete Testers. However, a Level I PCC Technician shall be provided to supervise the Concrete Tester.
2. From each third portion of the batch the mass (weight) of the concrete in one air meter measuring bowl shall be determined.
3. The air content of each third portion of the batch shall be determined according to ASTM C231 or ASTM C173. The air content shall be the arithmetic average of two (2) tests from each third portion of the batch.
4. The slump of each third portion of the batch shall be determined according to ASTM C143. The slump shall be the arithmetic average of two (2) tests from each third portion of the batch.
5. Flexural strength specimen(s) (two (2) breaks required) or two (2) compressive strength specimens shall be prepared from each third portion of the batch according to ASTM C31. Flexural strength specimen(s) (two (2) breaks required) shall be tested according to ASTM C78 at seven (7) days of age. Compressive strength specimens shall be tested according to ASTM C39 at seven (7) days of age.
6. The contents from the weighed air meter measuring bowl shall be washed over a No. 4 sieve. Shake as much water as possible from the material retained on the sieve and then weigh the material. The coarse aggregate content (portion of mass (weight) of sample retained on a No. 4 sieve), expressed as a percent, shall be calculated.

VI. CONCRETE UNIFORMITY REQUIREMENTS

- a. Test results from each third portion of the batch shall be compared to one another according to Table 1. Each batch shall be evaluated individually.
- b. Mixer performance tests consisting of ten (10) batches: If more than seven (7) tests out of the total or more than three (3) in any one criteria are not in compliance with the uniformity requirements (air content, slump, coarse aggregate content, and strength), a reduced mixing time will not be granted.
- c. Mixer performance tests consisting of three (3) batches: If more than three (3) tests out of the total are not in compliance with the uniformity requirements, a full ten (10) batch investigation shall be required.

Table 1. Requirements for Uniformity of Concrete

Test	Requirement (Note 1)
Air Content, percent by volume of concrete	1.0 (Note 2)
Slump, inch	1.0 (Note 3)
Coarse aggregate content, portion by weight of each sample retained on the No. 4 sieve, percent	6.0
Average flexural or compressive strength at 7 days for each sample based on average strength of all comparative test specimens, percent	7.5 (Note 4)

Note 1. Expressed as maximum permissible difference in results of tests of samples taken from three locations in the concrete batch.

Note 2. The average air content sample shall be the arithmetic average of two (2) tests.

Note 3. The average slump sample shall be the arithmetic average of two (2) tests.

Note 4. The average flexural strength of each sample shall be the arithmetic average of two (2) beam breaks. The average compressive strength of each sample shall be the arithmetic average of two (2) cylinder breaks.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 95-1 dated January 1, 1995

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004

Springfield

Number 96-1

TO: CONSULTING ENGINEERS

SUBJECT: ITEM 610, STRUCTURAL PORTLAND CEMENT CONCRETE:
JOB MIX FORMULA APPROVAL & PRODUCTION TESTING.

- I. This policy memorandum addresses the Job Mix Formula (JMF) approval process and production testing requirements when Item 610 is specified for an airport construction contract.
- II. PROCESS
 - a. The contractor may submit a mix design with recent substantiating test data or he may submit a mix design generated by the Illinois Division of Highways with recent substantiating test data for approval consideration. The mix design should be submitted to the Resident Engineer.
 - b. The Resident Engineer should verify that each component of the proposed mix meets the requirements set forth under Item 610 of the *Standard Specifications for Construction of Airports* and/or the contract special provisions.
 - c. The mix design should also indicate the following information:
 1. The name, address, and producer/supplier number for the concrete.
 2. The source, producer/supplier number, gradation, quality, and SSD weight for the proposed coarse and fine aggregates.
 3. The source, producer/supplier number, type, and weight of the proposed flyash and/or cement.
 4. The source, producer/supplier number, dosage rate or dosage of all admixtures.
 - d. After completion of Items b and c above, the mix with substantiating test data shall be forwarded to the Division of Aeronautics for approval. Once the mix has been approved the production testing shall be at the rate in Section III as specified herein.

III. PRODUCTION TESTING

- a. One set of cylinders or beams, depending on the strength specified, shall be cast for acceptance testing for each day the mix is used. In addition, at least one slump and one air test shall be conducted for each day the mix is used. If more than 100 c.y. of the mix is placed in a given day, additional tests at a frequency of 1 per 100 c.y. shall be taken for strength, slump, and air. In **no** case will concrete with a slump greater than 4 inches be allowed for use on the project.
- b. If the total proposed amount of Item 610 Structural Portland Cement Concrete as calculated by the Resident Engineer is less than 50 c.y. for the entire project, the following shall apply:
 - The Resident Engineer shall provide a copy of the calculations of the quantity of Item 610 to the Division of Aeronautics.
 - One set of cylinders or beams, depending the strength specified, shall be cast for acceptance testing.
 - One air content and one slump test shall be taken for acceptance testing.
 - In no case will concrete with a slump greater than 4 inches be allowed for use on the project.
- c. The Resident Engineer shall collect actual batch weight tickets for every batch of Item 610 concrete used for the project. The actual batch weight tickets shall be kept with the project records and shall be available upon request of the Department of Transportation.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 96-1 dated January 1, 2003

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 15, 2007

Springfield, Illinois

Number 96-2

TO: CONTRACTORS

SUBJECT: REQUIREMENTS FOR LABORATORY, TESTING, QUALITY CONTROL, AND PAVING OF BITUMINOUS CONCRETE MIXTURES

I. SCOPE

The purpose of this policy memorandum is to define to the Contractor the requirements concerning the laboratory, testing, Quality Control, and paving of bituminous concrete mixtures. References are made to the most recent issue of the Standard Specifications for Construction of Airports and to American Society for Testing and Materials (ASTM) testing methods. The Quality Assurance and acceptance responsibilities of the Engineer are described in Policy Memorandum 96-3.

II. LABORATORY

The Contractor shall provide a laboratory located at the plant and approved by the Illinois Division of Aeronautics (IDA). The laboratory shall be of sufficient size and be furnished with the necessary equipment and supplies for adequately and safely performing the Contractor's Quality Control testing as well as the Engineer's acceptance testing as described in Policy Memorandum 96-3.

The effective working area of the laboratory shall be a minimum of 600 square feet with a ceiling height of not less than 7.5 feet. Lighting shall be adequate to illuminate all working areas. It shall be equipped with heating and air conditioning units to maintain a temperature of 70° F ± 5° F.

The laboratory shall have equipment that is in good working order and that meets the requirements set forth in the following ASTM test standards:

ASTM C 117	Test Method for Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	Sieve or Screen Analysis of Fine and Coarse Aggregate
ASTM C 566	Total Moisture Content of Aggregate by Drying
ASTM D 75	Sampling Aggregates
ASTM D 1559	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D 2041	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172	Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
IDOT	Ignition Method for Determining Asphalt Content

ASTM D 2726	Bulk Specific Gravity of Compacted Bituminous Mixtures using Saturated Surface Dry Specimens
ASTM D 3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D 2950	Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 4125	Asphalt Content of Bituminous Mixtures by Nuclear Method
ASTM C 127	Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	Standard Test Method for Specific Gravity and Absorption of Fine Aggregate

The Asphalt Institute's *Mix Design Methods for Asphalt Concrete Manual No. 2 (MS-2)*

The laboratory and equipment furnished by the Contractor shall be properly calibrated and maintained. The Contractor shall maintain a record of calibration results at the laboratory. The Engineer may inspect measuring and testing devices at any time to confirm both calibration and condition. If the Resident Engineer determines that the equipment is not within the limits of dimensions or calibration described in the appropriate test method, the Engineer may stop production until corrective action is taken. If laboratory equipment becomes inoperable or insufficient to keep up with mix production testing, the Contractor shall cease mix production until adequate and/or sufficient equipment is provided.

III. MIX DESIGN SUBMITTAL

Based upon data and test results submitted by the Contractor, the Illinois Division of Aeronautics Engineer of Construction & Materials shall issue the final Job Mix Formula approval letter that concurs or rejects the Contractor's proposed JMF. The Contractor will be required to perform the sampling and laboratory testing and develop a complete mix design, according to the following guidelines:
[Note: A testing summary chart can be found in Appendix B.]

- A. Material sources meeting the requirements of the contract shall be submitted in writing at or before the preconstruction conference (see BITUMINOUS WORKSHEET in Appendix A) in the following format:
1. To: Steve Long, Acting Chief Engineer
Attn: Mike Wilhelm, Engineer of Construction & Materials
Division of Aeronautics
One Langhorne Bond Drive
Springfield, Illinois 62707
 2. Producer name and location of each aggregate
 3. Producer # for each aggregate (producers are assigned this number by IDOT Central Bureau of Materials)
 4. Material code for each aggregate
 5. Gradation and Quality designation for each aggregate (i.e. CA-11, etc.)
 6. Producer, producer #, and specific gravities of asphalt cement

7. Performance Graded Binder 64-22 shall be used unless otherwise approved by the IDA Engineer of Materials.
- B. The Contractor shall obtain representative samples of each aggregate. The individual obtaining samples shall have successfully completed the IDOT Aggregate Technician Course under the IDOT Division of Highways, QC/QA program. The sample size shall be approximately 280 lb. for each coarse aggregate, 150 lb. for each fine aggregate, 15 lb. for the mineral filler or collected dust, and 1 gallon of asphalt cement.
- C. The Contractor shall split the aggregate samples down and run gradation tests according to the testing methods referenced in Appendix B of this memorandum. The remaining aggregates shall be set aside for further Mix Design testing. The results of the gradation tests, along with the most recent stockpile gradations, shall be reported by fax to the IDA Engineer of Materials for engineering evaluation. If the gradation results are deemed non-representative or in any way unacceptable, new representative samples may be required at the direction of the IDA Engineer of Materials. Only composite gradations are required under this procedure.
- D. Based on the accepted gradation results, the Contractor will determine blend percentages in accordance with the contract specifications (see Section 201/401 – 3.2 JOB MIX FORMULA under Table 4) for each aggregate to be used in determining the Job Mix Formula, as well as mix temperature and asphalt content(s), and number of Marshall Blows for preparation of the Marshall Mix Design, or number of gyrations for Superpave Mix Design, depending on which design method is specified in the contract. The Contractor will verify the aggregate percentages, mix temperatures, asphalt content(s), and number of Marshall blows (or gyrations) with the IDA Engineer of Construction & Materials before beginning any testing.
- E. After verification of the information from step D., the Contractor shall make specimens and perform the following tests at various asphalt contents in order to obtain the optimum mix design. [Note: Actual test designation is referenced in Appendix B of this memorandum.]

Marshall Tests

Maximum Specific Gravity -- " G_{mm} "

Bulk Specific Gravity -- " G_{sb} "

Marshall Stability

Marshall Flow

% air voids

The JMF will be designed in accordance with Table 4 as modified in the Recurring Special Provisions for the type of mix being produced. Appendix C contains a copy of the Table 4 targets and ranges for the JMF.

- F. All technicians who will be performing mix design testing and plant sampling/testing shall have successfully completed the IDOT Division of Highways Bituminous Concrete Level 1 Technician Course "Bituminous Concrete Testing". The Contractor may also provide a Gradation Technician who has successfully completed the Department's "Gradation Technician Course" to run gradation tests only under the supervision of a Bituminous Concrete Level 2 Technician.
- G. The mix design testing results and resulting optimal JMF shall be reported to the IDA Engineer of Construction & Materials with the following data included:
- a) Aggregate & liquid asphalt material codes
 - b) Aggregate & liquid asphalt producer numbers, names, and locations
 - c) Aggregate Blend of each aggregate
 - d) Optimum Blend % for each sieve
 - e) AC Specific Gravity
 - f) Bulk Specific Gravity and Absorption for each aggregate
 - g) Summary of Marshall Design Data: AC % Mix, Stability, Flow, G_{mb} , G_{mm} , VMA, Voids (Total Mix), Voids Filled

- h) Optimum design data listing AC % Mix, Stability, Flow, G_{mb} , G_{mm} , VMA, Voids (Total Mix), Voids Filled
- i) Percent of asphalt that any RAP will add to the mix
- j) Graphs for the following: gradation on 0.45 Power Curve, AC vs. Voids (Total Mix), AC vs. Specific Gravities, AC vs. Voids Filled, AC vs. Stability, AC vs. Flow and VMA

- H. The IDA Engineer of Construction & Materials shall generate and issue a concurrence or rejection of the Contractor's proposed Mix Design with the JMF for the manufacture of bituminous mixtures based upon the Contractor's submitted testing and complete mix design results. The Contractor shall not be permitted to use the proposed HMA mix in production for the project until this concurrence letter is issued to the Contractor by the IDA Engineer of Construction & Materials, and the mix passes all test section requirements, when a test section is specified.
- I. The above procedure, III. MIX DESIGN SUBMITTAL shall be repeated for each change in source or gradation of materials.

IV. MIX PRODUCTION TESTING

The Quality Control of the manufacture and placement of bituminous mixtures is the responsibility of the Contractor. The Contractor shall perform or have performed the inspection and tests required to assure conformance to contract requirements. Quality Control includes the recognition of defects and their immediate correction. This may require increased testing, communication of test results to the plant or the job site, modification of operations, suspension of bituminous mix production, rejection of material, or other actions as appropriate. The Resident Engineer shall be immediately notified of any failing tests and subsequent remedial action. Form AER M-14 shall be reported to the Engineer and Resident Engineer no later than the start of the next work day. In addition, AER M-9 and M-11 shall be given to the Resident Engineer daily (Appendix A). The Contractor shall provide a Quality Control (QC) Manager who will have overall responsibility and authority for Quality Control. This individual shall have successfully completed the IDOT Division of Highways Bituminous Concrete Level II Technician Course "Bituminous Concrete Proportioning and Mixture Evaluation." In addition to the QC Manager, the Contractor shall provide sufficient and qualified personnel to perform the required visual inspections, sampling, testing, and documentation in a timely manner. The following plant tests and documentation shall be required: [Note: A summary chart of testing can be found in Appendix B.]

- A. Minimum of one (1) complete hot bin or combined belt analysis per day of production or every 1,000 tons, whichever is more frequent.
- B. Minimum one (1) stockpile gradation for each aggregate and/or mineral filler per week when a batch plant is utilized. Minimum of one (1) gradation for each aggregate per day of production or every 1,000 tons when a drum plant is used, and one (1) gradation per week for mineral filler when a drum plant is used.
- C. A certification from the quarry for the total quantity of aggregate listing the source, gradation type, and quality designation of aggregate shipped.
- D. Original asphalt shipping tickets listing the source and type of asphalt shipped.
- E. One mix sample per 1,000 tons of mix. The sample shall be split in half. One half shall be reserved for testing by the Engineer. The other half shall be split and tested by the Contractor for Marshall, Extraction, Gradation, Maximum Specific Gravity, and Air Void tests in accordance with the appropriate ASTM standard referenced herein. [See Appendix B.]
 - 1. In place of the extraction test, the Contractor may provide the asphalt content by a calibrated ignition oven test using the IDOT Division of Highways' latest procedure. The correction (calibration) factor for aggregate type shall be clearly indicated in the reported test results.

From these tests, the Contractor shall interpret the test data and make necessary adjustments to the production process in order to comply with the approved JMF.

V. QUALITY CONTROL

A. Control Limits

Target values shall be determined from the approved JMF. The target values shall be plotted on the control charts within the following control limits:

<u>Parameter</u>	<u>Control Limits</u>	
	<u>Individual Test</u>	<u>Moving Avg. of 4</u>
% Passing		
1/2 in.	± 7 %	± 4 %
No. 4	± 7 %	± 4 %
No. 8	± 5 %	± 3 %
No. 30	± 4 %	± 2.5 %
No. 200 *	± 2.0 % *	± 1.0 % *
Asphalt Content	± 0.45 %	± 0.2 %

* No. 200 material percents shall be based on washed samples. Dry sieve gradations (-200) shall be adjusted based on anticipated degradation in the mixing process.

B. Control Charts

Standardized control charts shall be maintained by the Contractor at the field laboratory. The control charts shall be displayed and be accessible at the field laboratory at all times for review by the Engineer. The individual required test results obtained by the Contractor shall be recorded on the control chart immediately upon completion of a test, but no later than 24 hours after sampling. Only the required plant tests and resamples shall be recorded on the control chart. Any additional testing of check samples may be used for controlling the Contractor's processes, but shall be documented in the plant diary.

The results of assurance tests performed by the Engineer will be posted as soon as available.

The following parameters shall be recorded on control charts:

1. Combined Gradation of Hot-Bin or Combined Belt Aggregate Samples (Drier Drum). (% Passing 1/2 in., No. 4., No. 8, No. 30, and No. 200 Sieves)
2. Asphalt Content
3. Bulk Specific Gravity of Marshall Sample
4. Maximum Specific Gravity of Mixture

C. Corrective Action for Required Plant Tests

Control Limits for each required parameter, both individual tests and the average of four tests, shall be exhibited on control charts. Test results shall be posted within the time limits previously outlined.

1. Individual Test Result. When an individual test result exceeds its control limit, the Contractor shall immediately resample and retest. If at the end of the day no material remains from which to resample, the first sample taken the following day shall serve as the resample as well as the first sample of the day. This result shall be recorded as a retest. If the retest passes, the Contractor may continue the required plant test frequency. Additional check samples should be taken to verify mix compliance.
2. Asphalt Content. If the retest for asphalt content exceeds control limits, mix production shall cease and immediate corrective action shall be instituted by the Contractor. After corrective action, mix production shall be restarted, the mix production shall be stabilized, and the Contractor shall immediately resample and retest. Mix production may continue when approved by the Engineer. The corrective action shall be documented.

Inability to control mix production is cause for the Engineer to stop the operation until the Contractor completes the investigation identifying the problems causing failing test results.

3. Combined Aggregate/Hot-Bin. For combined aggregate/hot-bin retest failures, immediate corrective action shall be instituted by the Contractor. After corrective action, the Contractor shall immediately resample and retest. The corrective action shall be documented.
 - a. Moving Average. When the moving average values trend toward the moving average control limits, the Contractor shall take corrective action and increase the sampling and testing frequency. The corrective action shall be documented.

The Contractor shall notify the Engineer whenever the moving average values exceed the moving average control limits. If two consecutive moving average values fall outside the moving average control limits, the Contractor shall cease operations. Corrective action shall be immediately instituted by the Contractor. Operations shall not be reinstated without the approval of the Engineer. Failure to cease operations shall subject all subsequently produced material to be considered unacceptable.
 - b. Mix Production Control. If the Contractor is not controlling the production process and is making no effort to take corrective action, the operation shall stop.

VI. TEST SECTION AND DENSITY ACCEPTANCE **(Note: Applies only when specified.)**

- A. The purpose of the test section is to determine if the mix is acceptable and can be compacted to a consistent passing density.

A quick way to determine the compactibility of the mix is by the use of a nuclear density gauge in the construction of a growth curve. An easy way to construct a growth curve is to use a good vibratory roller. To construct the curve, an area the width of the roller in the middle of the mat is chosen and the roller is allowed to make one compactive pass. With the roller stopped some 30 feet away, a nuclear reading is taken and the outline of the gauge is marked on the pavement. The roller then makes a compaction pass in the opposite direction and another reading is taken. This scenario is continued until at least two (2) passes are made past the maximum density obtained.

The maximum laboratory density potential of a given mix is a direct function of the mix design air voids. Whereas, the actual maximum field density is a function of the type of coarse aggregates, natural or manufactured sands, lift thickness, roller type (static or vibratory), roller and paver speed, base condition, mix variation, etc. All of these items are taken into consideration with the growth curve.

1. High Density in the Growth Curve. If the growth curve indicates a maximum achievable field density of between 95 to 98 percent of the Theoretical Maximum Density (D), you can proceed with the Rolling Pattern. On the other hand, if the maximum achievable density is greater than 98 percent, a quick evaluation (by use of an extractor, hot bin gradations, nuclear asphalt determinator, etc.) must be made of the mix. When adjustments are made in the mix, a new growth curve shall be constructed.
2. Low Density in the Growth Curve. If the growth curve indicates the maximum achievable density is below 94 percent, a thorough evaluation of the mix, rollers, and laydown operations should be made. After a thorough evaluation of all factors (mix, rollers, etc.), asphalt or gradation changes may be in order as directed by the Engineer. Again, any changes in the mix will require a new growth curve. Note that the nuclear density test is a quality control tool and not an acceptance test. All acceptance testing is to be conducted by the use of cores, unless otherwise specified.
3. Acceptance of Test Section. The Contractor may proceed with paving the day after the test section provided the following criteria have been met:
 - a. Four random locations (2 cores per location cut longitudinally and cored by the Contractor) will be selected by the Engineer within the test strip. No individual core can be below a minimum of 94% density.
 - b. All Marshall and extraction test results from mix produced for the test section must be within the tolerances required by specification.
 - c. The Contractor shall correlate his nuclear gauge to the cores taken in the test section. Additional cores may be taken at the Contractor's expense for this purpose within the test section area, when approved by the Engineer.
4. Density Acceptance under Production Paving. The responsibility for obtaining the specified density lies with the Contractor. Therefore, it is important that the nuclear density gauge operator communicate with the roller operators to maintain the specified density requirements. The Contractor shall provide a Bituminous Concrete Density Tester who has successfully completed the Department's "Bituminous Concrete Nuclear Density Testing Course" to run all required density tests on the job site. Density acceptance testing, unless otherwise specified, is described as follows:
 - a. The Contractor shall cut cores at random locations within 500 ton sublots as directed by the Resident Engineer.
 - b. The cores should be extracted so as not to damage them, since they are used to calculate the Contractor's pay.
 - c. The Engineer will run preliminary G_{mb} tests on the cores to give the Contractor an indication of how compaction is running for the next day's paving.

- d. A running average of four (4) Maximum Theoretical Gravities (G_{mm}) will be used for calculating percent compaction.
- e. Final core density tests and pay calculations will be performed by the Resident Engineer and delivered to the Contractor.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 96-2 dated April 1, 2004

APPENDIX A

BITUMINOUS WORKSHEET

Airport: _____ Project No.: _____ AIP No.: _____

Mix Design #: _____ Material Code: _____ Producer: _____

Prod. #: _____

AGGREGATE

Mat'l. Code: _____

Producer #: _____

Prod. Name _____

Location: _____

Percent Passing

Sieve Size

1 inch	_____	_____	_____	_____	_____
3/4 inch	_____	_____	_____	_____	_____
1/2 inch	_____	_____	_____	_____	_____
3/8 inch	_____	_____	_____	_____	_____
No. 4	_____	_____	_____	_____	_____
No. 8	_____	_____	_____	_____	_____
No. 16	_____	_____	_____	_____	_____
No. 30	_____	_____	_____	_____	_____
No. 50	_____	_____	_____	_____	_____
No. 100	_____	_____	_____	_____	_____
No. 200	_____	_____	_____	_____	_____
Washed (y/n)	_____	_____	_____	_____	_____
O.D. Gravity	_____	_____	_____	_____	_____
App. Gravity	_____	_____	_____	_____	_____
Absorption	_____	_____	_____	_____	_____

Asphalt Gravity _____ Asphalt Source _____ Asphalt Producer No. _____

MARSHALL DATA

% Asphalt _____

M. Stability _____

Flow _____

D _____

0 _____

% Air Voids _____

Q.C. Manager Name: _____ Phone number: _____

Laboratory Location: _____ Fax Number: _____

Remarks: _____

Bituminous Mixtures Extraction

Date: _____

Airport: _____ Consultant: _____

Illinois Project: _____ Contractor: _____

AIP Project No.: _____ Producer: _____

Mix #: _____ Dry Time: _____ Lot: _____ Sublot: _____

Type: _____ Washed: _____

Sieve	Wt.	Accum. Wt.	% Passing	Mix Formula	Tolerance	Spec Range
1.5						
1						
3/4						
1/2						
3/8						
4						
8						
16						
30						
50						
100						
200						
Tot Agg						
Bit						

Extraction Data	
Pan, New Filter & Sample	g _____
Pan & New Filter	g _____
Sample	g _____
Pan, Used Filter, Aggregate	g _____
Pan & New Filter	g _____
Aggregate	g _____
Pan & Used Filter	g _____
Pan & New Filter	g _____
Dust in Filter	g _____
Sample	g _____
Aggregate	g _____
Bitumen	g _____

New Bit:	Marshall Stab:	Blows:	Gyro:	Flow:	TSR:
Bulk SPGR:	Max SPGR:	% Voids:	DEN (PCF):		

Remarks: _____

CC: _____ Tested by: _____

APPENDIX B

QUALITY CONTROL TESTING (PLANT)

PARAMETER	FREQUENCY	SAMPLE SIZE	TEST METHOD	REPORT FORM
Aggregate Gradations: Hot bins for batch and continuous plants--- Individual cold-feeds or combined belt-feeds for drier drum plants.	Minimum 1 per day of production and at least 1 per 1000 tons.	CA07/11: 5000 gm CA13: 2000 gm CA16: 1500 gm Fine agg: 500 gm 1 gallon asphalt cement	ASTM C 136	AER M-9
Aggregate gradations: Stockpiles	Minimum 1 per aggregate per week per stockpile.	CA07/11: 5000 gm CA13: 2000 gm CA16: 1500 gm Fine agg: 500 gm *Note: The above test sample sizes are to be obtained from splitting down a larger sample from the stockpiles.	ASTM C 136	AER M-9
Maximum Specific Gravity	Minimum 1 per 1000 tons	1200 gm per test	ASTM D 2041	AER M-11 and AERM-14
Bulk Specific Gravity	Minimum 1 per 1000 tons	1250 gm per briquette	ASTM D 2726	AER M-11 and AERM-14
Marshall Stability and Flow	Minimum 1 per 1000 tons	1250 gm per briquette	ASTM D 1559	AER M-11 and AERM-14
% Air Voids	Minimum 1 per 1000 tons		ASTM D 3203	AER M-11 and AERM-14
Extraction	Minimum 1 per 1000 tons	1000 gm (surface) 1500 gm (base)	ASTM D 2172	AER M-11 and AERM-14
Ignition Oven Test	Minimum 1 per 1000 tons	1500 gm		AER M-14
Nuclear Asphalt Gauge	Minimum 1 per 1000 tons	1000-1100 gm	ASTM D 2145	AER M-14

MIX DESIGN TESTING

PARAMETER	FREQUENCY	SAMPLE SIZE	TEST METHOD	REPORT FORM
Representative samples of each aggregate and asphalt cement.	1 per aggregate and 1 asphalt cement.	280 lb. (coarse) 150 lb. (fine) 15 lb. (min. filler) 1 gallon asphalt cement	ASTM D 75	N/A
Aggregate Gradation	1 per aggregate	CA07/11: 5000 gm CA13: 2000 gm CA16: 1500 gm Fine agg: 500 gm	ASTM C 136	Bituminous Worksheet (Appendix A)
Maximum Specific Gravity	2 per specified asphalt content	1200 gm per test	ASTM D 2041	Bituminous Worksheet (Appendix A)
Bulk Specific Gravity	3 briquettes per specified asphalt content	1250 gm per briquette	ASTM D 2726	Bituminous Worksheet (Appendix A)
Marshall Stability and Flow	3 briquettes	1250 gm per briquette	ASTM D 1559	Bituminous Worksheet (Appendix A)
% Air Voids	1 per specified asphalt content (Avg. of G_{sb}/G_{mm})		ASTM D 3203	Bituminous Worksheet (Appendix A)

QUALITY CONTROL TESTING (PAVER)

PARAMETER	FREQUENCY	SAMPLE SIZE	TEST METHOD	REPORT FORM
Nuclear Density Test	As required by the Contractor to maintain consistent passing density	Various locations	ASTM D 2950	

APPENDIX C

AGGREGATE BITUMINOUS BASE COURSE

Percentage by Weight Passing Sieves Job Mix Formula (JMF)		
Sieve Size	Gradation B Range 1" Maximum	Ideal Target
1-1/4 in.	---	---
1 in.	100	100
3/4 in.	93 – 97	95
1/2 in.	75 – 79	77
3/8 in.	64 – 68	66
No. 4	45 – 51	48
No. 8	34 – 40	37
No. 16	27 – 33	30
No. 30	19 – 23	21
No. 100	6 – 10	8
No. 200	4 – 6	5
Bitumen %:		
Stone	4.5 – 7.0	5.5

AGGREGATE BITUMINOUS SURFACE COURSE

Percentage by Weight Passing Sieves Job Mix Formula (JMF)		
Sieve Size	Gradation B Range $\frac{3}{4}$" Maximum	Ideal Target
1 in.	100	---
3/4 in.	100	100
1/2 in.	99 - 100	100
3/8 in.	91 - 97	94
No. 4	56 – 62	59
No. 8	36 - 42	39
No. 16	27 - 32	30
No. 30	19 - 25	22
No. 100	7 – 9	8
No. 200	5 – 7	6
Bitumen %:		
Stone	5.0 – 7.0	6.0

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004

Springfield, Illinois

Number 96-3

TO: CONSULTING ENGINEERS

SUBJECT: REQUIREMENTS FOR QUALITY ASSURANCE ON PROJECTS
WITH BITUMINOUS CONCRETE PAVING

I. SCOPE

The purpose of this policy memorandum is to define to the Consulting Engineer the requirements concerning Quality Assurance on bituminous concrete paving projects. Specifically, this memo applies whenever the Contractor is required to comply with the requirements set forth in Policy Memorandum 96-2, "*Requirements for Laboratory, Testing, Quality Control, and Paving of Bituminous Concrete Mixtures*".

II. LABORATORY APPROVAL

The Resident Engineer shall review and approve the Contractor's plant laboratory to assure that it meets the requirements set forth in the contract specifications and Policy Memorandum 96-2. This review and approval shall be completed prior to utilization of the plant for the production of any mix.

III. QUALITY ASSURANCE DURING PRODUCTION PAVING

A. At the option of the Engineer, independent assurance tests may be performed on split samples taken by the Contractor for Quality Control testing. In addition, the Resident Engineer shall witness the sampling and splitting of these samples at the start of production and as needed throughout mix production. The Engineer may select any or all split samples for assurance testing. These tests may be performed at any time after sampling. The test results will be made available to the Contractor as soon as they become available.

B. The Resident Engineer may witness the sampling and testing being performed by the Contractor. If the Resident Engineer determines that the sampling and Quality Control tests are not being performed according to the applicable test procedures, the Engineer may stop production until corrective action is taken. The Resident Engineer will promptly notify the Contractor, both verbally and in writing, of observed deficiencies. The Resident Engineer will document all witnessed samples and tests. The Resident Engineer may elect to obtain samples for testing, separate from the Contractor's Quality Control process, to verify specification compliance.

1. Differences between the Contractor's and the Engineer's split sample test results will be considered acceptable if within the following limits:

<u>Test Parameter</u>	<u>Acceptable Limits of Precision</u>
% Passing	
1/2 in.	5.0 %
No. 4	5.0 %
No. 8	3.0 %
No. 30	2.0 %
No. 200	2.2 %
Asphalt Content	0.3 %
Maximum Specific Gravity of Mixture	0.026
Bulk Specific Gravity of Marshall Sample	0.045

2. In the event a comparison of the required plant test results is outside the above acceptable limits of precision, split or independent samples fail the control limits, an extraction indicates non-specification mix, or a continual trend of difference between Contractor and Engineer test results is identified, the Engineer will immediately investigate. The Engineer may suspend production while the investigation is in progress. The investigation may include testing by the Engineer of any remaining split samples or a comparison of split sample test results on the mix currently being produced. The investigation may also include review and observation of the Contractor's technician performance, testing procedure, and equipment. If a problem is identified with the mix, the Contractor shall take immediate corrective action. After corrective action, both the Contractor and the Engineer shall immediately resample and retest.

- C. The Contractor shall be responsible for documenting all observations, records of inspection, adjustments to the mixture, test results, retest results, and corrective actions in a bound hardback field book or bound diary which will become the property of IDA upon completion and acceptance of the project. The Contractor shall be responsible for the maintenance of all permanent records whether obtained by the Contractor, the Contractor's Consultants, or the producer of bituminous mix material. The Contractor shall provide the Engineer full access to all documentation throughout the progress of the work.

Results of adjustments to mixture production and tests shall be recorded in duplicate and sent to the Engineer.

IV. ACCEPTANCE BY ENGINEER

Density acceptance shall be performed according to Policy Memorandum 87-2, or according to the acceptance procedure outlined in the Special Provisions.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 96-3 dated January 1, 1997

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004

Springfield, Illinois

Number 97-2

TO: CONSULTING ENGINEERS

SUBJECT: PAVEMENT MARKING PAINT ACCEPTANCE

I. SCOPE

The purpose of this policy memorandum is to define the procedure for acceptance of pavement marking paint.

II. RESIDENT ENGINEER'S DUTIES

The Resident Engineer shall follow the acceptance procedure outlined as follows:

- A. Require the painting contractor to furnish the name of the paint manufacturer and the batch number proposed for use prior to beginning work. Notify the I.D.A. Materials Certification Engineer when this information is available.
- B. Require the manufacturer's certification before painting begins. Check the certification for compliance to the contract specifications.
 1. The certification shall be issued from the manufacturer and shall include the specification and the batch number.
 2. The paint containers shall have the manufacturer's name, the specification and the batch number matching the certification.
- C. If no batch number is indicated on the certification or containers, sample the paint according to the procedure for the corresponding paint type.
- D. If the I.D.A. Engineer of Materials indicates that batch number has not been previously sampled and tested, sample the paint according to the procedure for the corresponding paint type. The Division of Aeronautics will provide paint cans upon request by the Resident Engineer. Samples will only be taken in new epoxy lined cans so that the paint will not be contaminated. It is important to seal the sample container immediately with a tight cover to prevent the loss of volatile solvents.

Mark the sample cans with the paint color, manufacturer's name, and batch number. The paint samples and manufacturer's certification shall be placed in the mail within 24 hours after sampling. Address the samples to the Materials Certification Engineer at:

Illinois Department of Transportation
Division of Aeronautics
One Langhorne Bond Drive
Springfield, Illinois 62707

Sampling Procedures for Each Paint Type:

1. Waterborne or Solvent Base Paints
 - a. Take the paint sample from the spray nozzle when the contractor begins marking. A sample consists of two one-pint cans taken per batch number.
 - b. Be sure to indicate to the contractor that acceptance of material is based upon a passing test of the paint material.

2. Epoxy Paint
 - a. Take separate one-pint samples of each paint component prior to marking. Before drawing samples, the contents of each component's container must be thoroughly mixed to make certain that any settled portion is fully dispersed. **Do not combine the two components or sample from the spray nozzle.**
 - b. Be sure to indicate to the contractor that acceptance of material is based upon a passing test of the paint material.

III. TESTING

The paint will be tested for acceptance by the IDOT Bureau of Materials and Physical Research for conformance to the contract specifications.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes policy memorandum 97-2 dated February 27, 2002

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004	Springfield, Illinois	Number: 2001-1
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TO: CONTRACTORS

SUBJECT: REQUIREMENTS FOR COLD WEATHER CONCRETING

I. PURPOSE

- A. This policy memorandum outlines the minimum requirements for cold weather concreting. Cold weather is defined as whenever the average ambient air temperature during day or night drops below 40°F.

II. COLD WEATHER CONCRETING PLAN

- A. The contractor shall submit a cold weather concreting plan to the Engineer for approval. Cold weather concreting operations are not allowed to proceed until the contractor's cold weather concreting plan has been approved by the Engineer.
- B. The contractor's plan shall be in compliance with this memorandum and shall address, as a minimum, the following:
1. Concrete Mix Manufacturing
 2. Concrete Mix Temperature Monitoring
 3. Base Preparation
 4. Concrete Curing and Protection
 5. In Place Concrete Temperature Monitoring
 6. Strength Test Specimens

III. MINIMUM REQUIREMENTS

A. Concrete Mix Manufacturing

1. The contractor must make the necessary adjustments so that the concrete temperature is maintained from 50°F to 90°F for placement. Acceptable methods include:
 - a) Heating the mixing water Note: If the mixing water is to be heated to a temperature above 100°F, the contractor must include a mixing sequence plan to indicate the order that each component of the mix is to be charged into the mixer.

- b) Heating the aggregates Note: The exact method of heating the aggregates shall be included as part of the cold weather concreting plan. Aggregates must be free of ice and frozen lumps. To avoid the possibility of a quick or flash set of the concrete, when either the water or aggregates are heated to above 100°F, they should be combined in the mixer first before the cement is added.

B. Concrete Mix Temperature

1. The contractor shall monitor the mix temperature at the plant and prior to placement in the forms. Mix that does not meet the temperature requirement of 50°F to 90°F shall be rejected for use on the project.

C. Base Preparation

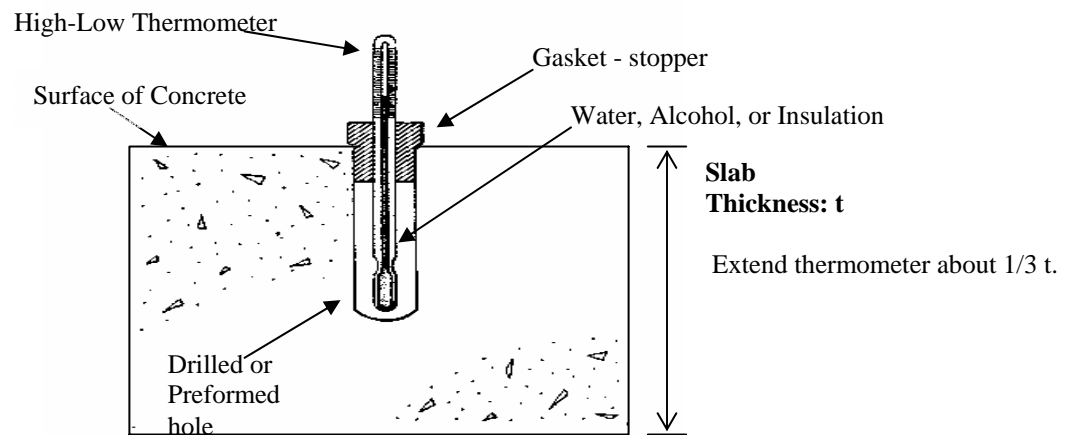
1. Paving or placing concrete on a frozen base, subbase, or subgrade is prohibited.
2. The base, subbase, or subgrade on which the concrete is to be placed shall be thawed and heated to at least 40°F. The method by which the base subbase or subgrade is to be heated shall be indicated in the contractor's cold weather concreting plan. Insulating blankets or heated enclosures may be required.

D. Concrete Protection and Curing

1. In addition to the curing options available in article 501-3.17 (a) (b), (c), and (d) of the Standard Specifications for Construction of Airports, the contractor shall protect the concrete in such a manner as to maintain a concrete temperature of at least 50°F for 10 days.
2. The method of concrete protection shall be by use of insulating layer or heated enclosure around the concrete. The method of protection shall be indicated in the contractor's cold weather concreting plan. When insulating layers are to be used, the thermal resistance to heat transfer (R Value in °F*hr*ft²/BTU) of the insulation material selected, shall be appropriate for the slab thickness being constructed and shall be indicated in the cold weather concreting plan.
3. Appendix A shows a chart and table taken from the American Concrete Institute specification, ACI 306 R Cold Weather Concreting, which may be used by the contractor in selecting the proper insulation (R Value) and insulating material which may be used.

E. In-Place Concrete Temperature Monitoring

1. Once the concrete is in place, the protection method used, must ensure that the concrete temperature does not fall below 50°F for the time period specified in Section (D. 1.) of this Policy Memorandum (10 days).
2. The concrete temperature on the surface and below the surface must be monitored and recorded by the contractor for the duration of the protection period in Section (D. 1.).
3. After the concrete has hardened, surface temperature can be checked with special surface thermometers or with an ordinary thermometer that is kept covered with insulating blankets. The high and low values for each 24-hour period of protection must be measured and recorded.
4. One acceptable method of checking temperature below the concrete surface is given in the Portland Cement Association (PCA) book entitled "Design and Control of Concrete Mixtures" latest edition. The method is indicated below and it should be noted that the thermometer should be capable of recording high and low values for a given 24-hour period.



Scheme for measuring concrete temperature below the surface.

5. The exact method for surface and sub-surface concrete temperature monitoring shall be indicated in the contractor's cold weather concreting plan. The maximum permissible difference between the interior and surface temperature is 35 °F. Adjustments in protection method shall be implemented if the maximum permissible difference is exceeded.

F. Strength specimen handling

1. The Contractor is responsible for making, transporting, and curing all samples (beams or cylinders)
2. The Contractor is required to load the testing machine and dispose of the broken pieces.
3. Onsite, indoor curing facilities, meeting the requirements of ASTM C-31, shall be required for cold weather concreting operations.

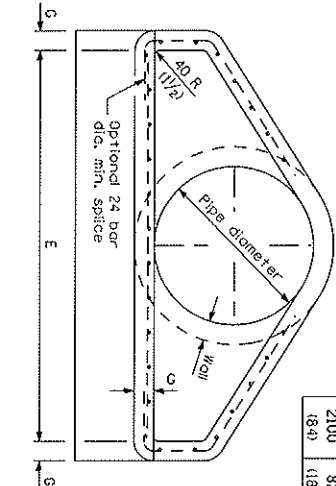
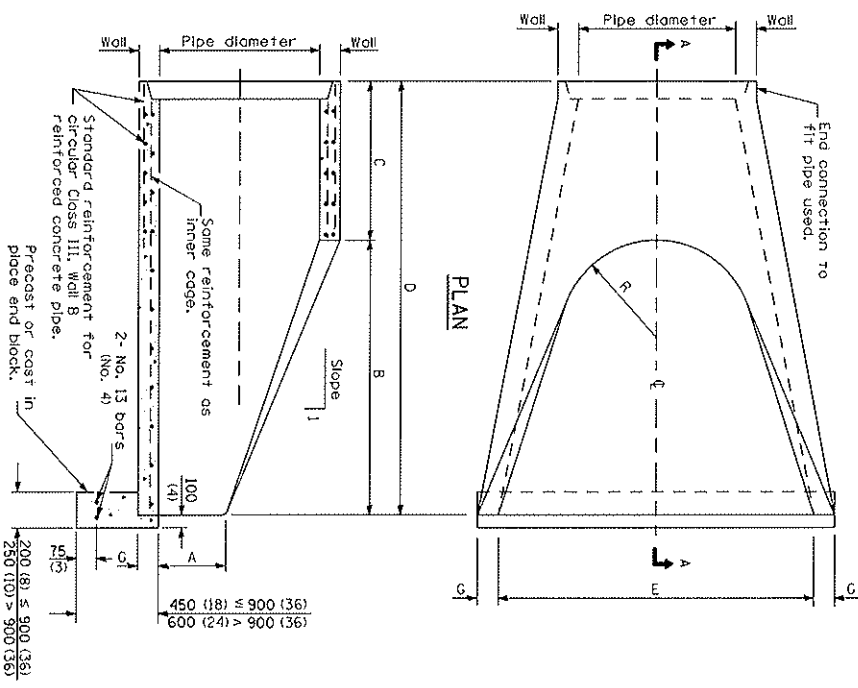
4. Sampling for strength specimens shall be according to the Contract Special Provisions. Sampled concrete shall be transported to the indoor curing facilities for the casting of strength specimens.
5. The exact location and description of the curing facilities shall be indicated in the contractor's cold weather concreting plan.
6. The method of transporting concrete sampled from the grade to the curing facilities for casting shall be indicated in the contractor's cold weather concreting plan.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 2001-1 dated January 1, 2001

IDOT STANDARD DETAILS

Illinois Department of Transportation
 APPROVED: [Signature] 2007
 ENGINEER OF BRIDGES AND STRUCTURES
 APPROVED: [Signature] 2007
 REGISTERED PROFESSIONAL ENGINEER
 LICENSE NO. 1-1-97




PIPE DIA. (IN)	APPROX. WALL THICKNESS (IN)	A	B	C	D	E	G	R	APPROX. SLOPE	
300	240	51	102	610	1,241 m	1,851 m	610	51	229	1:2.4
(12)	(530)	(2)	(4)	(24)	(4'-0 1/2")	(6'-0 7/8")	(24)	(2)	(9)	1:2.4
375	335	57	152	686	1,168 m	1,854 m	762	57	280	1:2.4
(15)	(740)	(2 1/4)	(6)	(27)	(3'-10")	(6'-1")	(30)	(2 1/4)	(11)	1:2.4
450	450	64	229	686	1,168 m	1,854 m	914	64	305	1:2.4
(18)	(990)	(2 1/2)	(9)	(27)	(3'-10")	(6'-1")	(36)	(2 1/2)	(12)	1:2.4
525	580	70	229	889	965	1,854 m	1,067 m	70	330	1:2.4
(21)	(1,280)	(2 3/4)	(9)	(35)	(38)	(6'-1")	(3'-6")	(13)	(13)	1:2.4
600	690	76	241	1,105 m	762	1,867 m	1,219 m	76	356	1:2.5
(24)	(1,520)	(3)	(9 1/2)	(3'-7 1/2")	(30)	(6'-1 1/2")	(4'-0")	(3)	(14)	1:2.5
675	875	83	267	1,219 m	648	1,867 m	1,372 m	83	368	1:2.4
(27)	(1,930)	(3 1/4)	(10 1/2)	(4'-0")	(25 1/2)	(6'-1 1/2")	(4'-6")	(3 1/4)	(14 1/2)	1:2.4
750	995	89	305	1,375 m	502	1,874 m	1,524 m	89	381	1:2.5
(30)	(2,190)	(3 1/2)	(12)	(4'-6")	(19 1/2)	(6'-1 3/4")	(5'-0")	(3 1/2)	(15)	1:2.5
825	1,450	95	343	1,486 m	997	2,483 m	1,676 m	95	445	1:2.5
(33)	(3,200)	(3 3/4)	(13 1/2)	(4'-10 1/2")	(39 1/2)	(8'-1 3/4")	(5'-5")	(3 3/4)	(17 1/2)	1:2.5
900	1,860	102	381	1.6 m	883	2,483 m	1,829 m	102	508	1:2.5
(36)	(4,100)	(4)	(15)	(5'-3")	(34 1/2)	(8'-1 3/4")	(6'-0")	(4)	(20)	1:2.5
1,050	2,440	114	533	1.6 m	889	2,489 m	1,981 m	114	559	1:2.5
(42)	(5,380)	(4 1/2)	(21)	(5'-3")	(35)	(8'-2")	(6'-6")	(4 1/2)	(22)	1:2.5
1,200	2,970	127	610	1,829 m	660	2,489 m	2,134 m	127	559	1:2.5
(48)	(6,550)	(5)	(24)	(6'-0")	(26)	(8'-2")	(7'-0")	(5)	(22)	1:2.5
1,350	3,740	140	686	1,651 m	889	2,54 m	2,286 m	140	610	1:2.0
(54)	(8,240)	(5 1/2)	(27)	(5'-5")	(35)	(8'-4")	(7'-6")	(5 1/2)	(24)	1:2.0
1,500	3,960	152	889	1,524 m	991	2,515 m	2,438 m	127	591	1:1.9
(60)	(8,730)	(6)	(35)	(5'-0")	(39)	(8'-3")	(8'-0")	(5)	(24)	1:1.9
1,650	4,860	165	762	1,829 m	686	2,515 m	2,591 m	140	610	1:1.7
(66)	(10,710)	(6 1/2)	(30)	(6'-0")	(42)	(8'-3")	(8'-6")	(5 1/2)	(24)	1:1.7
1,800	5,680	178	914	1,981 m	533	2,514 m	2,743 m	152	610	1:1.8
(72)	(12,520)	(7)	(36)	(6'-6")	(42)	(8'-3")	(9'-0")	(6)	(24)	1:1.8
1,950	6,700	191	914	2,286 m	533	2,819 m	2,896 m	165	610	1:1.8
(78)	(14,770)	(7 1/2)	(36)	(7'-6")	(42)	(9'-3")	(9'-6")	(6 1/2)	(24)	1:1.8
2,100	8,240	203	914	2,298 m	533	2,832 m	3,048 m	165	610	1:1.6
(84)	(18,160)	(8)	(36)	(7'-6 1/2")	(42)	(9'-3 1/2")	(10'-0")	(6 1/2)	(24)	1:1.6

* Radius as furnished by manufacturer

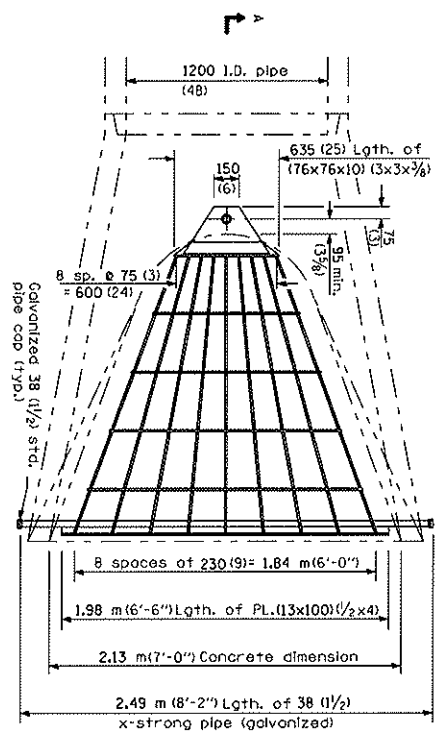
GENERAL NOTES
 All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V/H).
 All dimensions are in millimeters (inches) unless otherwise shown.

DATE	REVISIONS
1-1-07	Soft converted metric Reinforcement bars.
1-1-97	Renum. Standard 249-L Deleted DN symbol.

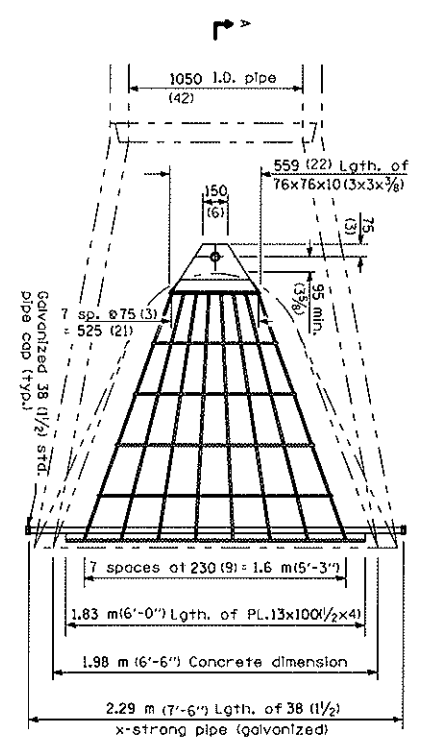
PRECAST REINFORCED CONCRETE FLARED END SECTION
 STANDARD 542301-01


 Quebec Department of Transportation
 PASSED 1987
 APPROVED 1987
 ENGINEER OF QUALITY AND PERFORMANCE
 16-1-1
 155040

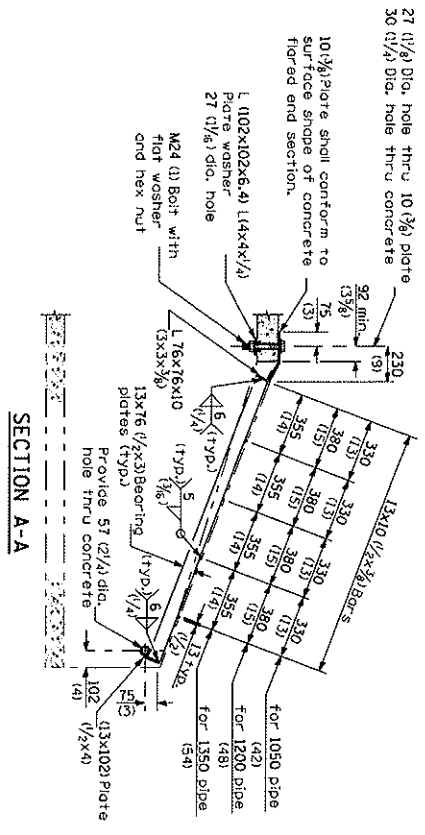
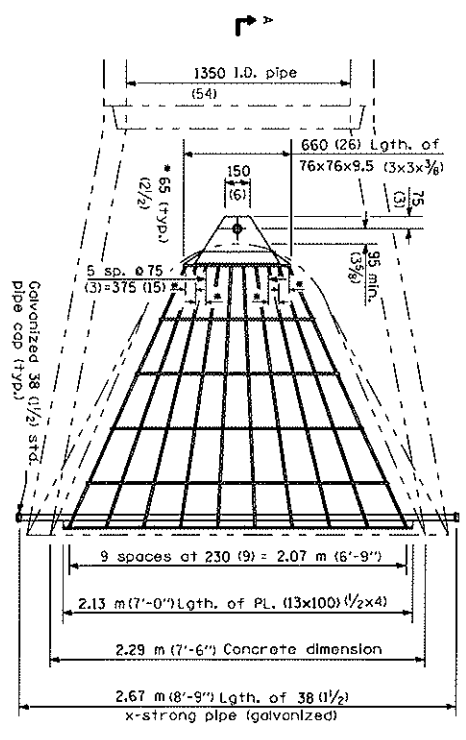
PLAN
 Quantity of steel = 181 kg (400 lbs.)



PLAN
 Quantity of steel = 145 kg (320 lbs.)



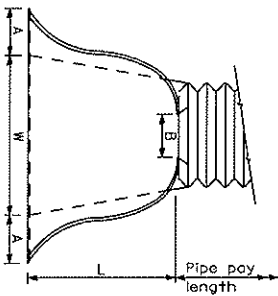
PLAN
 Quantity of steel = 193 kg (425 lbs.)



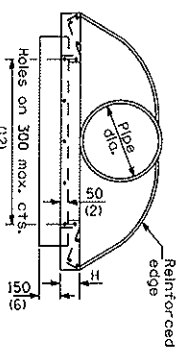
GRATING FOR CONCRETE
 FLARED END SECTION
 (FOR 600 mm (24") THRU
 1350 mm (54") PIPE)
 (Sheet 2 of 2)
STANDARD 542311

All dimensions are in millimeters (inches) unless otherwise shown.

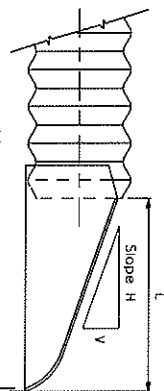
PIPE DIA.	THICK-NESS	DIMENSIONS					SLOPE (Approx.) (V/H)	BODY
		A	B	H	L	W		
300	1.63	25 ± (1)	25 ± (max.)	38 ± (1 1/2)	50 ± (2)	1:2 1/2	1 P.C.	
375	1.63	180	205	150	660	1:2 1/2	1 P.C.	
450	1.63	205	255	150	785	1:2 1/2	1 P.C.	
525	1.63	230	305	150	915	1:2 1/2	1 P.C.	
600	1.53	255	330	150	1040	1:2 1/2	1 P.C.	
750	2.01	305	405	205	1295	1:2 1/2	1 P.C.	
900	2.01	355	480	230	1525	1:2 1/2	2 P.C.	
1050	2.17	405	560	280	1750	1:2 1/2	2 P.C.	
1200	2.17	455	685	305	1990	1:2 1/4	2 P.C.	
1350	2.17	455	760	305	2135	1:2	2 P.C.	
1500	2.17	455	840	305	2210	1:1 3/4	3 P.C.	
1650	2.17	455	915	305	2210	1:1 1/2	3 P.C.	
1800	2.17	455	990	305	2210	1:1 1/2	3 P.C.	
1950	2.17	455	1065	305	2210	1:1 1/4	3 P.C.	
2250	2.17	455	1145	305	2210	1:1 1/8	3 P.C.	



PLAN



END VIEW



SIDE VIEW

END SECTION

NOTES

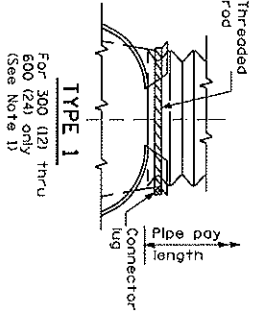
For 1500 mm (60") thru 2250 mm (84") sizes, reinforced edges shall be supplemented with stiffener angles. The angles shall be 51x51x6.4 mm (2x2x1/4") for 1500 mm (60") thru 1800 mm (72") diameter and 64x64x6.4 mm (2 1/2x2 1/2x1/4") for 1950 mm (78") thru 2250 mm (84") diameter. The angles shall be attached by M10 (3/8") rivets or bolts.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V/H).

NOTES

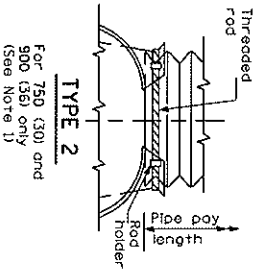
- Types 1 and 2 for pipes with annular ends only.
- Type 3 connection can be used for all pipe sizes and includes 300 mm (12") of the pipe length. The connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. Stud shall be either 68 mm (2 3/4") pitch x 13 mm (1/2") depth or 75 mm (3") pitch x 25 mm (1") depth annular corrugated pipe.
- Type 4 connection can be used for all pipe sizes. Coupler shall be 68 mm x 13 mm (2 3/4 x 1/2) dimple, flange, or annular type. Flange or annular shall be 68 mm x 25 mm (2 3/4 x 1) and be used with unpigged metal pipe annular ends. For corrugated metal pipe having helical ends, only the dimple bond will be allowed.

All dimensions are in millimeters (inches) unless otherwise shown.



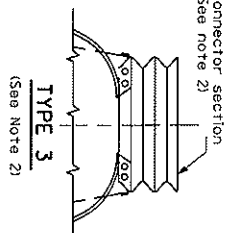
TYPE 1

For 300 (12) thru 600 (24) only (See Note 1)



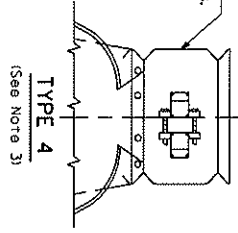
TYPE 2

For 750 (30) and 900 (36) only (See Note 1)



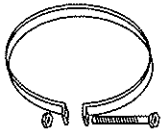
TYPE 3

(See Note 2)



TYPE 4

(See Note 3)



29 (1) wide, 2.17 (0.109) thick strap with standard M12x150 (1/2x6) bond bolt and nut.

ALTERNATE STRAP CONNECTOR

For Type 1 only

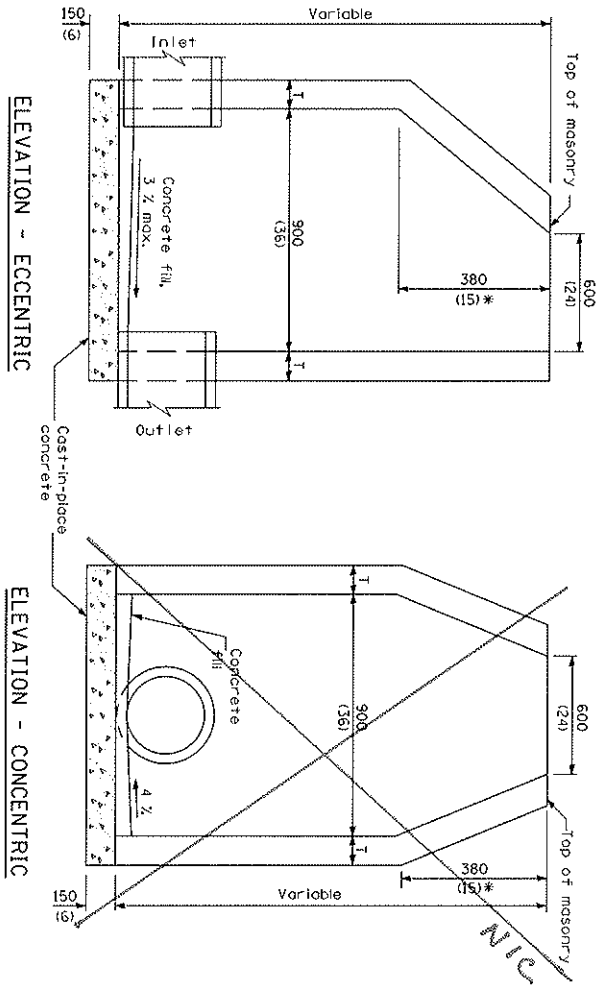
CONNECTIONS OF END SECTIONS

ILLINOIS DEPARTMENT OF TRANSPORTATION
 DIVISION OF BRIDGE ENGINEERING
 APPROVED: [Signature]
 DATE: 11/19/91
 DRAWN BY: [Signature]
 DATE: 11/19/91
 CHECKED BY: [Signature]
 DATE: 11/19/91

DATE	REVISIONS
1-1-97	Re-num. Standard 2228-5.
6-15-94	Moved 3 Notes to Specs. Added Metric.

METAL END SECTION FOR PIPE CULVERTS
STANDARD 542401

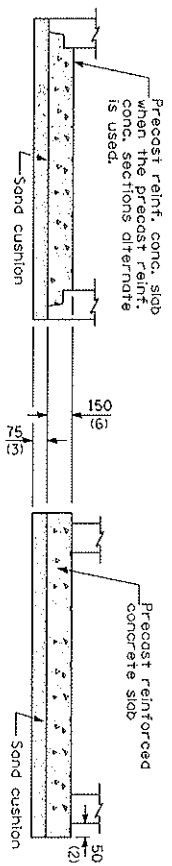
MODIFIED



ELEVATION - ECCENTRIC

ELEVATION - CONCENTRIC

ALTERNATE MATERIALS FOR WALLS		T
	(mm)	
Concrete Masonry Unit	125	NIC
Brick Masonry	200	NIC
Precast Reinforced Concrete Section	75	NIC
Cast-in-place Concrete	150	NIC



ALTERNATE BOTTOM SLAB

GENERAL NOTES

* This dimension for Precast Reinforced Concrete Sections may vary from the dimension given to plus 150 mm (6").

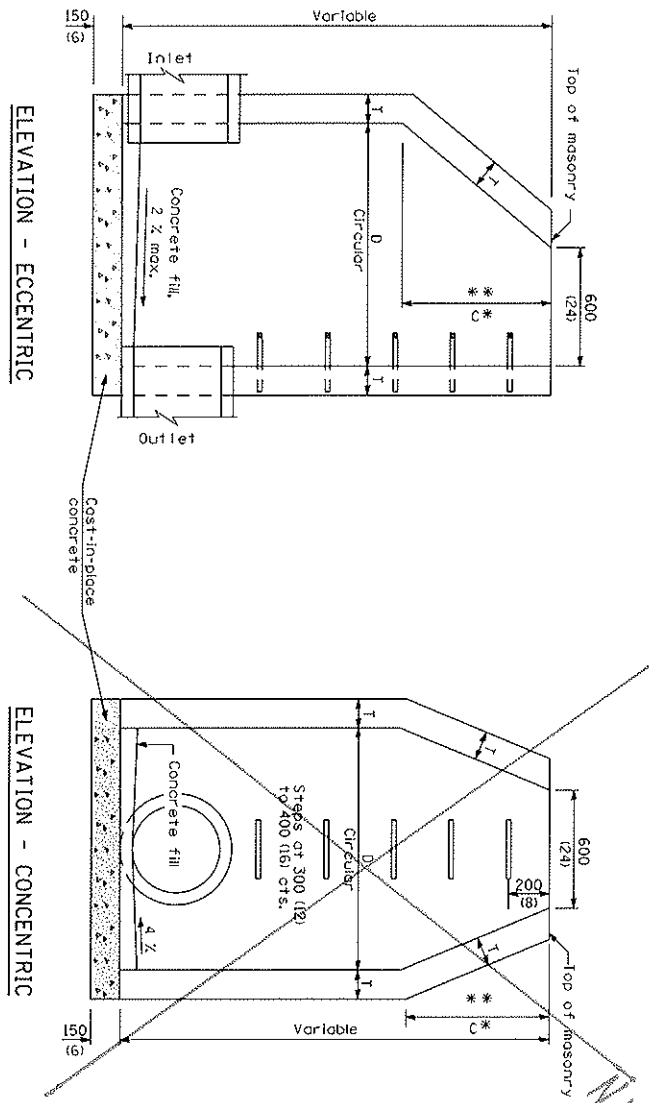
See Standard 602601 for Optional Precast Reinforced Concrete Flat Slab Top.

All dimensions are in millimeters (inches) unless otherwise shown.

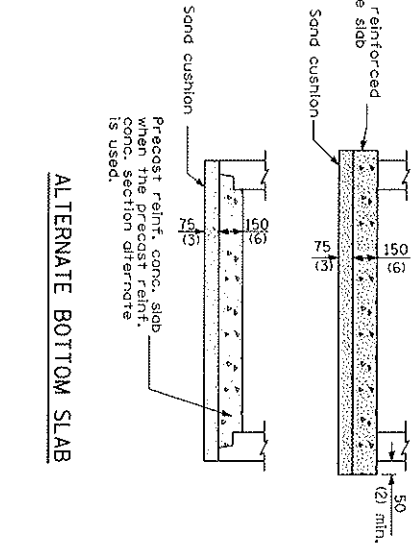
British Department of Transportation
 PAS580
 Approved by the
 ENGINEER OF PUBLIC WORKS PROCEDURES
 Approved by the
 MINISTER OF DEFENCE AND ENVIRONMENT
 1550ED 1-1-97

DATE	REVISIONS	
4-1-06	Revised detail for concrete fill in elevation views.	INLET - TYPE B
1-1-97	Renum. Standard 2349-L.	STANDARD 602306-01
	Added set of details with dived bottoms.	

MODIFIED



1525020 1-1-97
 Illinois Department of Transportation
 Approved: [Signature]
 Date: 4-1-06
 Engineer: [Signature]
 Date: 4-1-06
 Project: [Signature]
 Date: 1-1-97



ALTERNATE MATERIALS FOR WALLS			
	D	C	I (min.)
Concrete Masonry Unit	1.2 m (4'-0") 750 (30)	1.25 m (4'-1") 750 (30)	125 (5)
Block Masonry	1.5 m (5'-0") 1115 m (3'-9")	1.5 m (5'-0") 1115 m (3'-9")	125 (5)
Precast Reinforced Concrete Section	1.2 m (4'-0") 750 (30)	1.25 m (4'-1") 750 (30)	100 (4)
Cast-in-place-concrete	1.2 m (4'-0") 750 (30)	1.5 m (5'-0") 1115 m (3'-9")	150 (6)

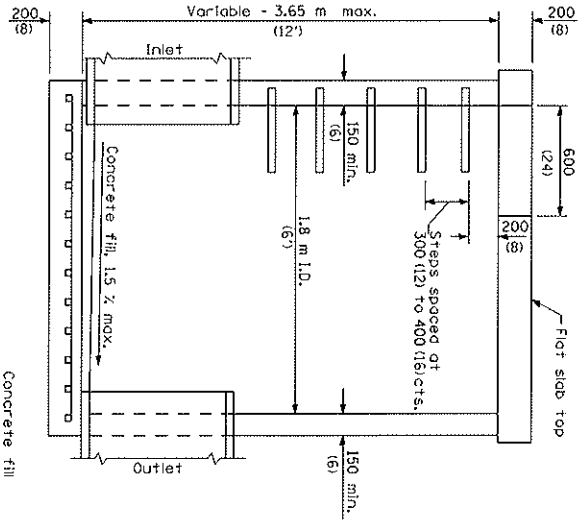
GENERAL NOTES

- See Standard 602701 for details of steps.
- * Dimension "C" for Precast Reinforced Concrete Sections may vary from the dimension given to plus 150 mm (6").
- ** See Standard 602601 for optional Precast Reinforced Concrete Flat Slab Top.
- All dimensions are in millimeters (inches) unless otherwise shown.

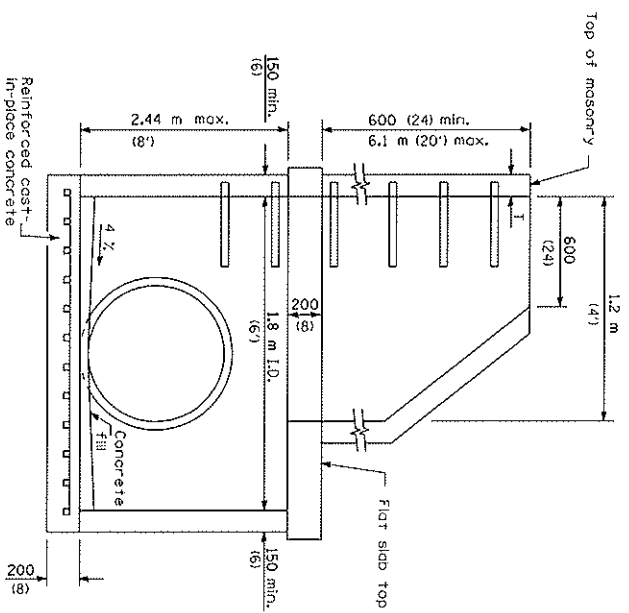
DATE	REVISIONS
4-1-06	Revised detail for concrete fill in elevation views.
1-1-97	Revised Standard 1527-10.

MANHOLE TYPE A
 STANDARD 602401-01

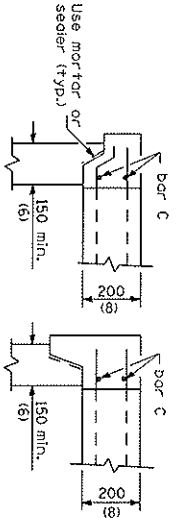
MODIFIED



ELEVATION



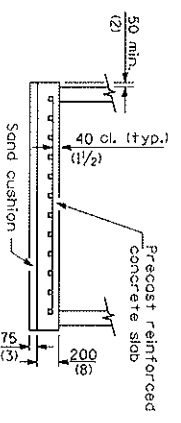
ELEVATION



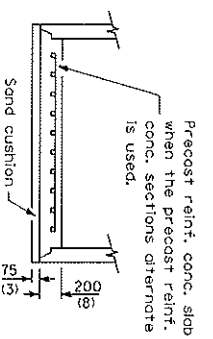
ALTERNATE JOINT CONFIGURATIONS

ALTERNATE MATERIALS FOR WALLS	T (min)
Concrete-Masonry-Units	125 (5)
Precast Reinforced Concrete Sections	100 (4)
Cast-in-Place-Concrete	150 (6)

mic



ALTERNATE BOTTOM SLABS



GENERAL NOTES

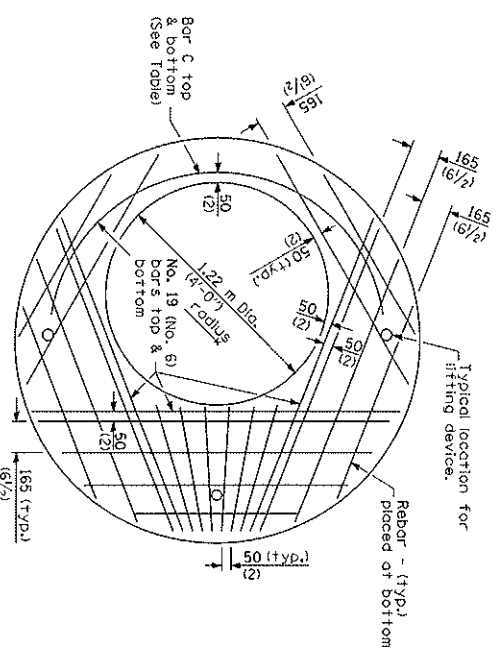
Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.
 Lifting devices shall be approved by the Engineer.
 Bottom slabs shall be reinforced with a minimum of 975 mm 2/m (0.46 sq. in./ft.) in both directions.
 See Standard 602701 for details of manhole steps.
 All dimensions are in millimeters (inches) unless otherwise shown.

1555040 1-1-97
 Illinois Department of Transportation
 APR 1, 2006
 ENGINEER OF PROJECT AND PROCEDURES
 APPROVED: *[Signature]*
 ENGINEER OF DESIGN AND ENVIRONMENT

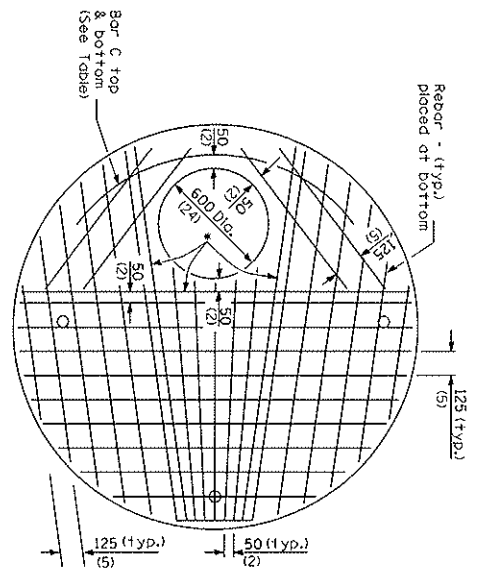
DATE	REVISIONS
4-1-06	Revised detail for concrete fill in elevation views.
1-1-03	Added general note for reinforcement.

MANHOLE TYPE A
1.8 m (6') DIAMETER
 (Sheet 1 of 2)
STANDARD 602406-02

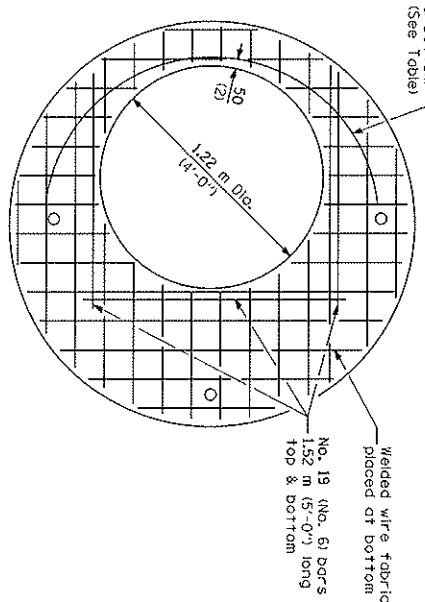
INMCO Department of Transportation
 PASSED APRIL 1, 2006
 ENGINEER OF PUBLIC AND PROCEEDURES
 APPROVED APRIL 1, 2006
 ENGINEER OF DESIGN AND ESTIMATES



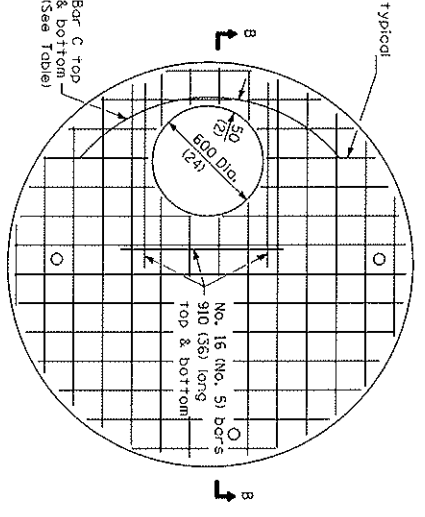
Showing Rebar Reinforcement



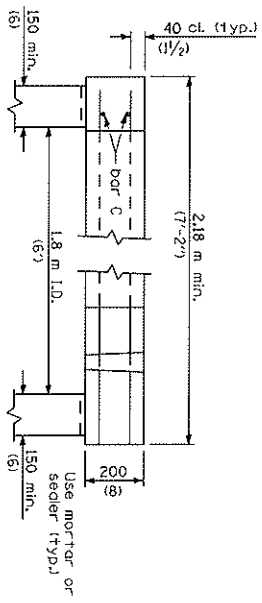
* No. 19 (No. 6) bars top & bottom



Showing Welded Wire Fabric Reinforcement



Diameter of opening	Thickness	Reinforcement "As" WWF Each direction	Bar Size	No. 13 (No. 4) Bar C	
				Length	Radius
600 (24)	200 (8)	2244 sq. mm/m (1.06) sq. in./ft.	No. 19 (No. 6)	1.83 m (6'-0")	965 (38)
1.2 m (4'-0")	200 (8)	1736 sq. mm/m (0.82) sq. in./ft.	No. 19 (No. 6)	2.74 m (9'-0")	965 (38)

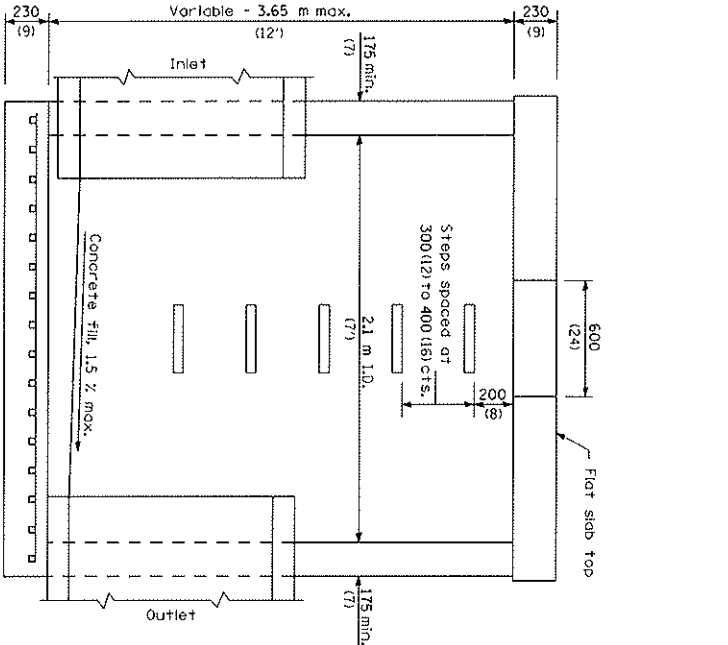


SECTION B-B

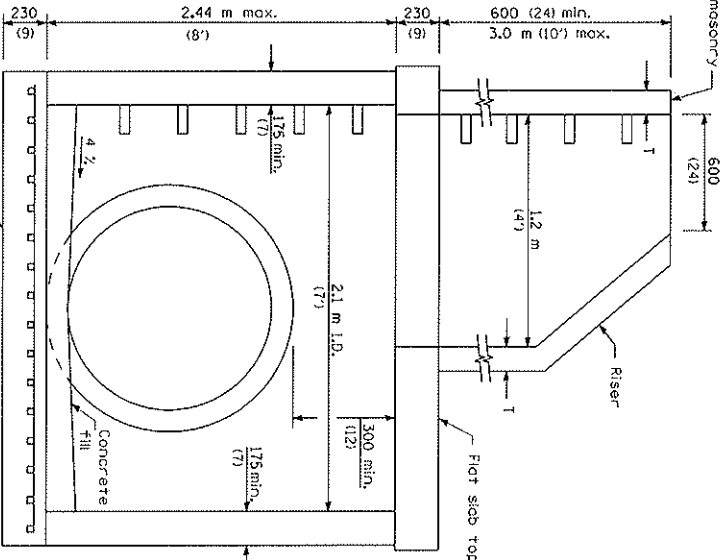
All dimensions are in millimeters (inches) unless otherwise shown.

MANHOLE TYPE A
 1.8 m (6') DIAMETER
 (Sheet 2 of 2)
 STANDARD 602406-02

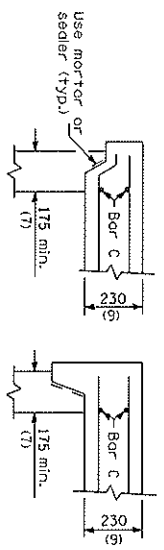
MODIFIED



ELEVATION
(With Flat Slab Top Only)



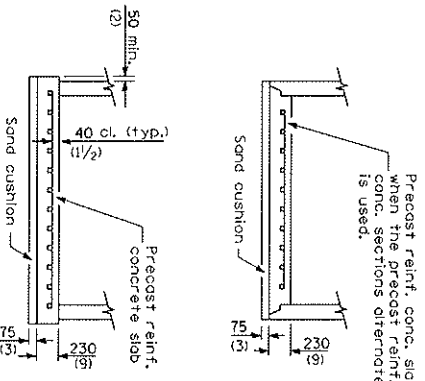
ELEVATION
(With Flat Slab Top and Riser)



ALTERNATE JOINT CONFIGURATIONS

ALTERNATE MATERIALS FOR RISER WALLS	
Concrete Masonry Units	125 (37)
Precast Reinforced Concrete Sections	100 (44)
Cast-in-Place Concrete	150 (57)

MLC



ALTERNATE BOTTOM SLABS

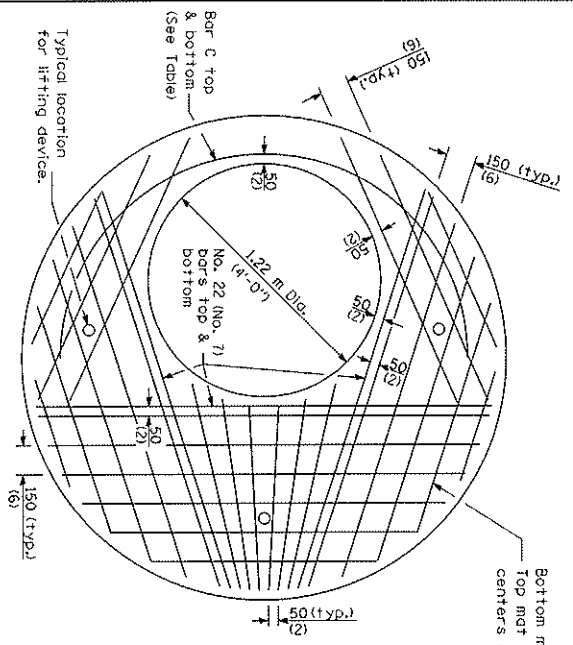
GENERAL NOTES

- Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.
- Lifting devices shall be approved by the Engineer.
- Bottom slabs shall be reinforced with a minimum of 1270 sq. mm/m (1050 sq. in./ft²) in both directions.
- See Standard 602101 for details of manhole steps.
- All dimensions are in millimeters (inches) unless otherwise shown.

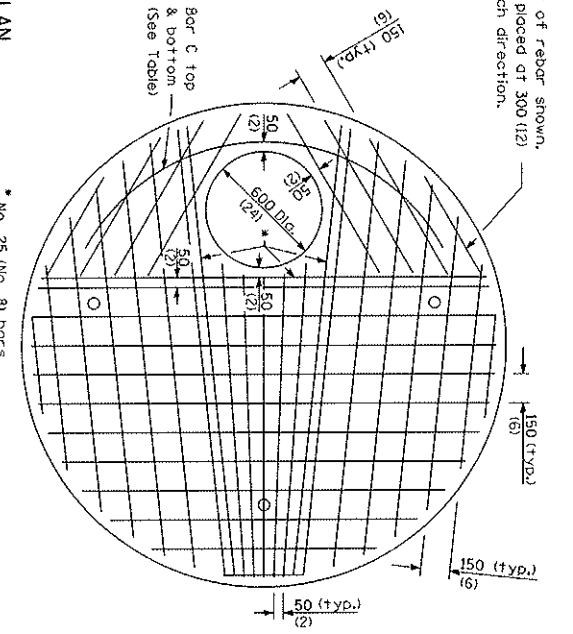
Illinois Department of Transportation
 743520
 ENGINEER
 APPROVED
 DESIGNER

DATE	REVISIONS
4-1-06	New Standard

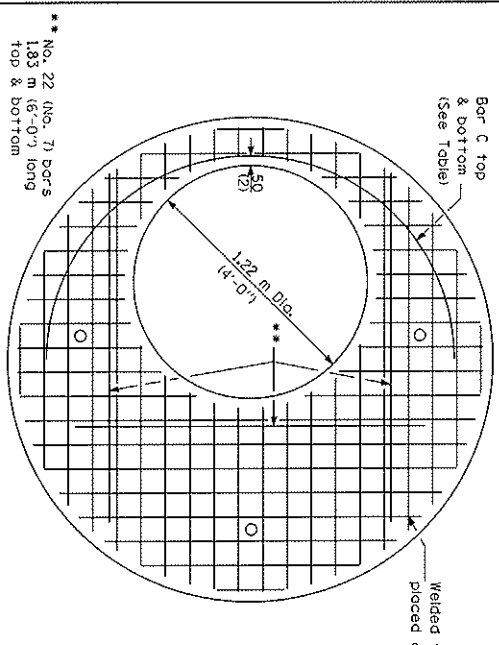
MANHOLE TYPE A
2.1 m (7') DIAMETER
 (Sheet 1 of 2)
STANDARD 602411



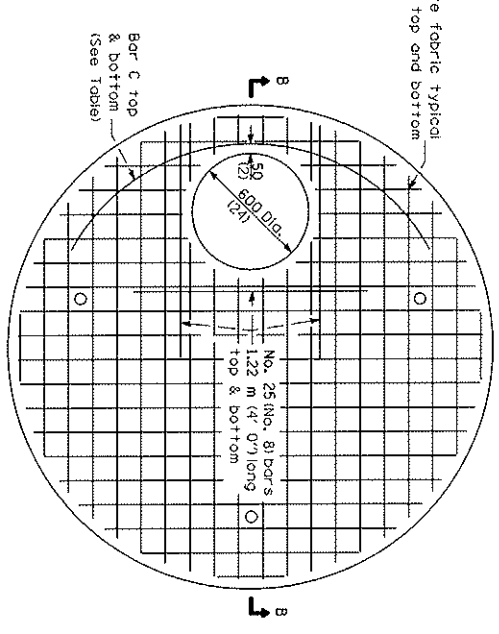
PLAN
Showing Rebar Reinforcement



PLAN
Showing Rebar Reinforcement



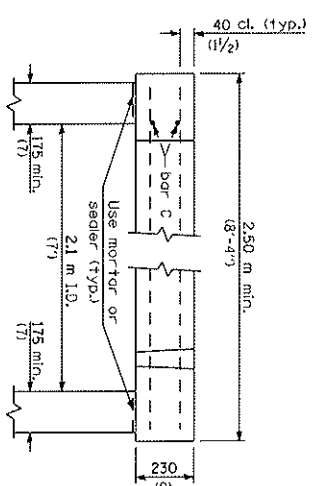
PLAN
Showing Welded Wire Fabric Reinforcement



PLAN
Showing Welded Wire Fabric Reinforcement

Diameter of opening	Reinforcement Bar Size	Reinforcement "As" w/f each direction	No. 13 (No. 4) Bar C Length	No. 13 (No. 4) Bar C Radius
600 (24)	Bottom mat No. 25 (No. 8)	Bottom mat *** 3325 sq. mm/m (1.57) sq. in./ft.	2.30 m (7'-6")	1.057 m (3'-6")
	Top mat No. 13 (No. 4)	Top mat *** 425 sq. mm/m (0.20) sq. in./ft.		
1.2 m (4'-0")	Bottom mat No. 22 (No. 7)	Bottom mat *** 2540 sq. mm/m (1.20) sq. in./ft.	3.35 m (11'-0")	1.057 m (3'-6")
	Top mat No. 13 (No. 4)	Top mat *** 425 sq. mm/m (0.20) sq. in./ft.		

*** A maximum of two layers of welded wire fabric may be used to satisfy the required "As" for each mat.



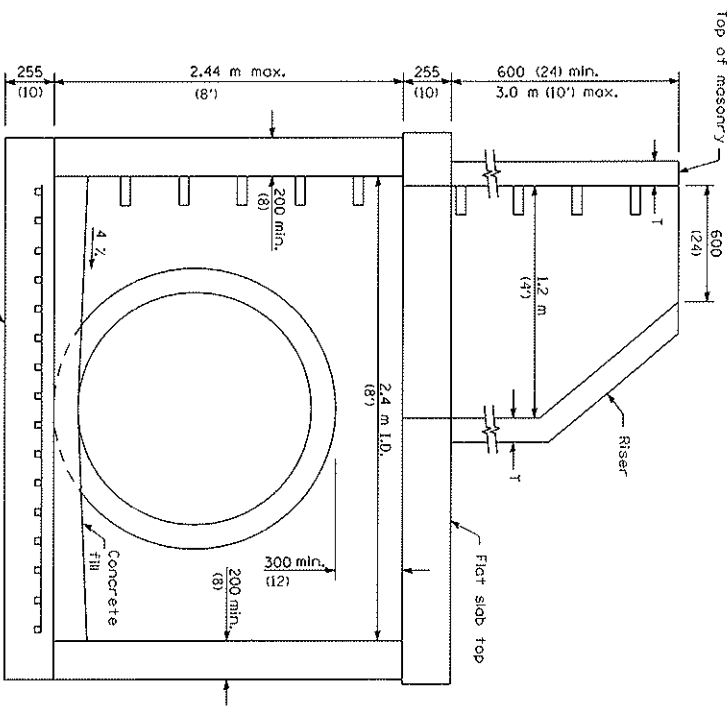
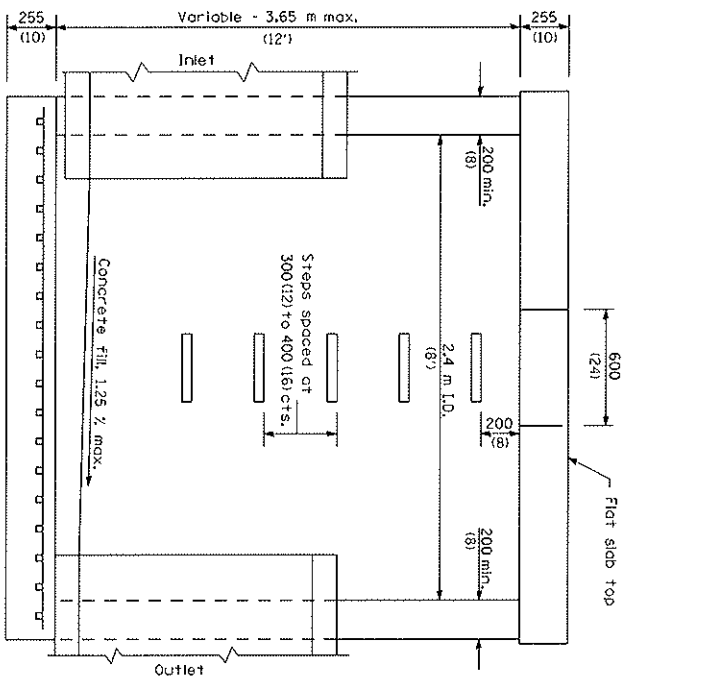
SECTION B-B
(Typical of each top)

All dimensions are in millimeters (inches) unless otherwise shown.

MANHOLE TYPE A
2.1 m (7') DIAMETER

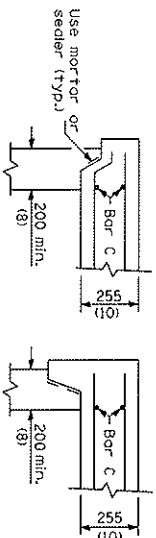
INTEGRITY Department of Transportation
 PASSED: April 3, 2006
 ENGINEER: [Signature]
 APPROVED: [Signature]
 DESIGNER: [Signature]
 DRAWN: [Signature]
 CHECKED: [Signature]
 153060 4-1-06

MODIFIED



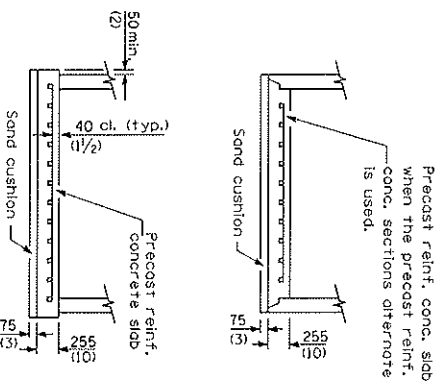
ELEVATION
(With Flat Slab Top Only)

ELEVATION
(With Flat Slab Top and Riser)



ALTERNATE MATERIALS FOR RISER WALLS	T (min)
Concrete-Masonry Units	125 (5)
Precast Reinforced Concrete Sections	100 (4)
Cast-in-Place Concrete	150 (6)

ALTERNATE JOINT CONFIGURATIONS



ALTERNATE BOTTOM SLABS

GENERAL NOTES

Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.

Lifting devices shall be approved by the Engineer.

Bottom slabs shall be reinforced with a minimum of 1350 sq. mm/m (0.833 sq. in./ft.) in both directions.

See Standard 602701 for details of manhole steps.

All dimensions are in millimeters (inches) unless otherwise shown.

Issue Department of Transportation

ISSUED 4-1-06

APPROVED: *Michael Lee* 2005

DESIGNED: *Schiffsky*

ENGINEER: *Michael Lee*

PROJECT: *MANHOLE TYPE A*

DATE: *April 1, 2005*

DATE	REVISIONS
4-1-06	New Standard

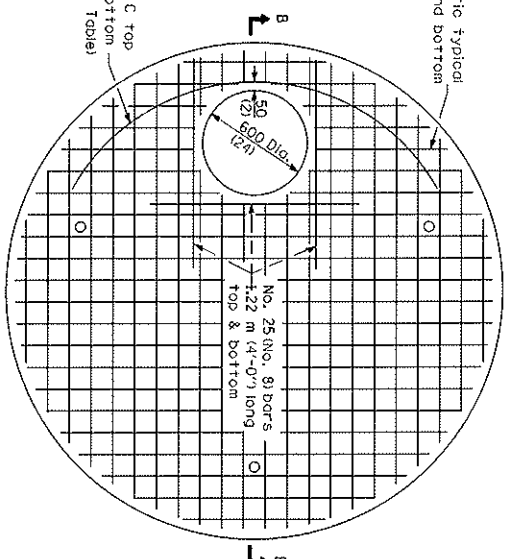
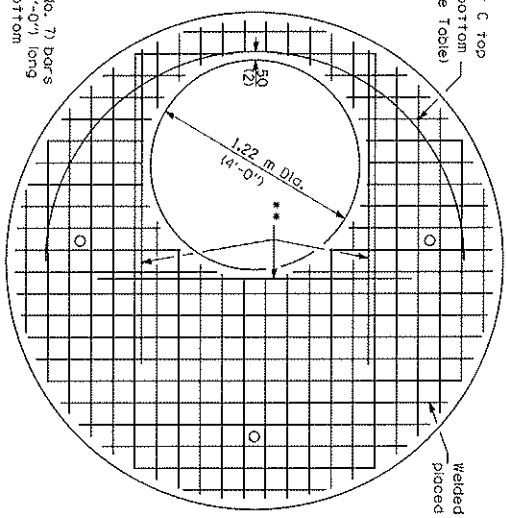
MANHOLE TYPE A
2.4 m (8') DIAMETER
(Sheet 1 of 2)

STANDARD 602416

Illinois Department of Transportation
 PASSED April 1, 2008
 ENGINEER OF PUBLIC WORKS
 APPROVED [Signature] April 1, 2008
 DESIGNER OF DESIGN AND ENVIRONMENT [Signature]
 ISSUED 4-1-08

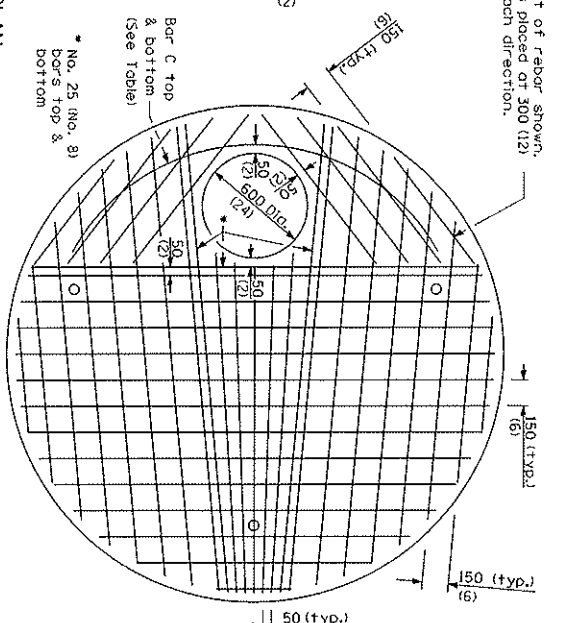
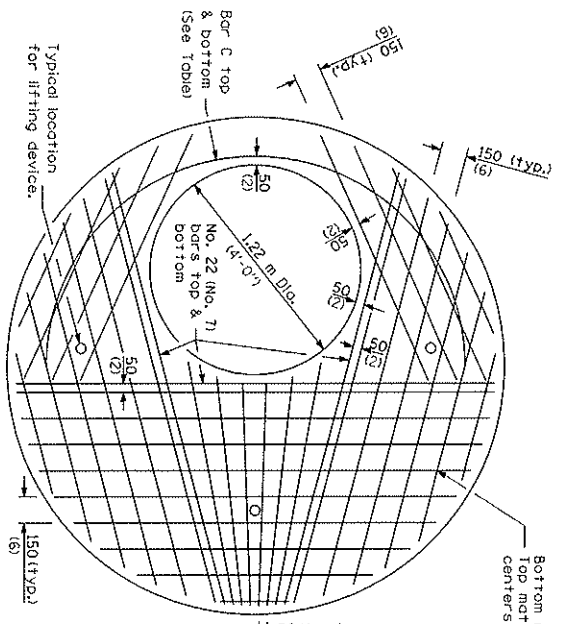
Showing Welded Wire Fabric Reinforcement

PLAN



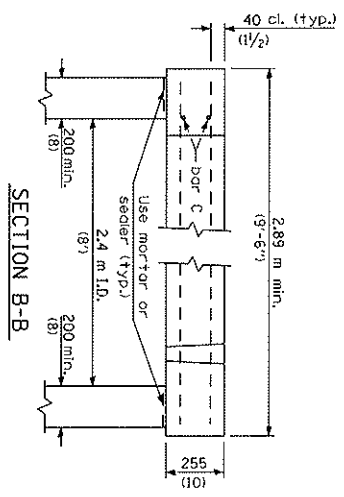
Showing Rebar Reinforcement

PLAN



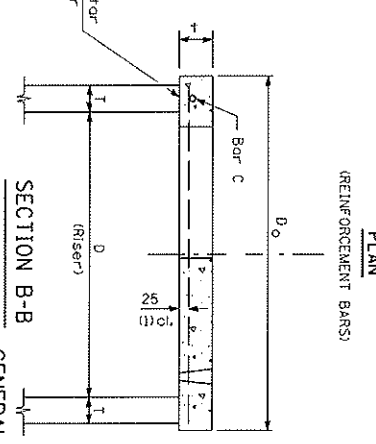
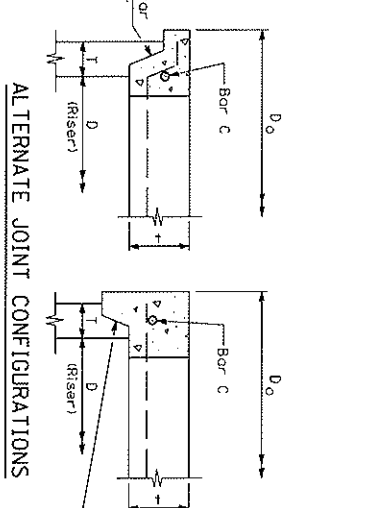
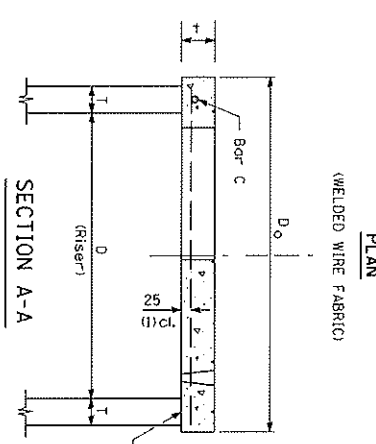
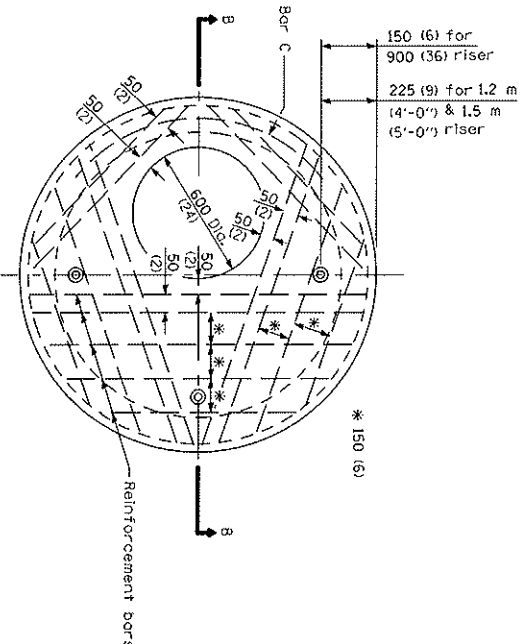
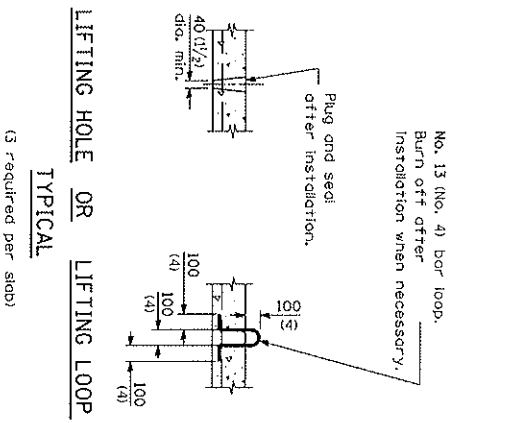
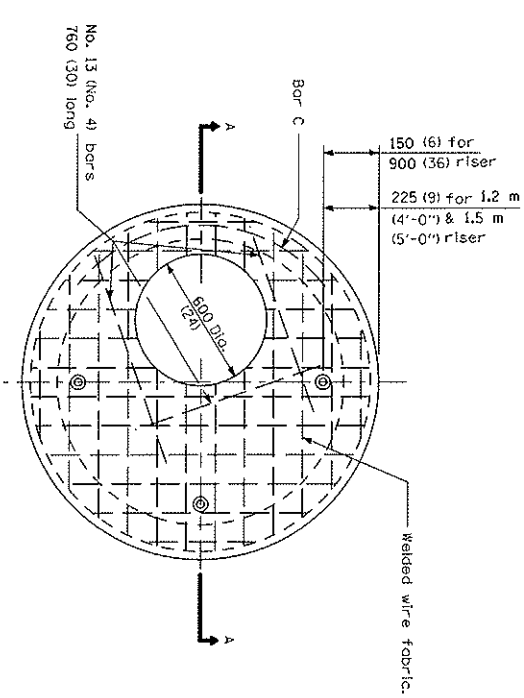
Diameter of opening	Reinforcement Bar Size	Reinforcement "As" WWF each direction	No. 13 (No. 4) Bar C Radius
600 (24)	Bottom mat No. 25 (No. 8)	Bottom mat *** 3325 sq. mm/m (1.57) sq. in./ft.	260 m (8'-6") 1219 m (4'-0")
	Top mat No. 13 (No. 4)	Top mat *** 470 sq. mm/m (0.22) sq. in./ft.	
1.2 m (4'-0")	Bottom mat No. 22 (No. 7)	Bottom mat *** 2540 sq. mm/m (1.20) sq. in./ft.	380 m (12'-6") 1219 m (4'-0")
	Top mat No. 13 (No. 4)	Top mat *** 470 sq. mm/m (0.22) sq. in./ft.	

*** A maximum of two layers of welded wire fabric may be used to satisfy the required "As" for each mat.



All dimensions are in millimeters (inches) unless otherwise shown.

MANHOLE TYPE A
 2.4 m (8') DIAMETER
 (Sheet 2 of 2)
 STANDARD 602416



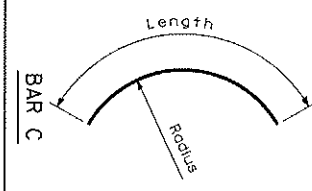
GENERAL NOTES

The flat slab top may be used in lieu of the tapered tops shown on Standards 602001, 602011, 602306, 602401, or 602501 at the option of the Contractor or when field conditions prohibit the use of tapered tops.

All dimensions are in millimeters (inches) unless otherwise shown.

TABLE

D	T	D _o (min.)	Reinforcement "A _s " W.W.F. each direction	OR Bar size	No. 15 (No. 4) Bar Length
900 (36)	See applicable Standards	150 (6)	425 sq. inch/ft. ²	No. 13 (4)	480 (19)
1.2 m (4'-0")		150 (6)	740 mm ² /m	No. 16 (5)	660 (26)
1.5 m (5'-0")		200 (8)	740 mm ² /m (135 sq. inch/ft. ²)	No. 16 (5)	810 (32)



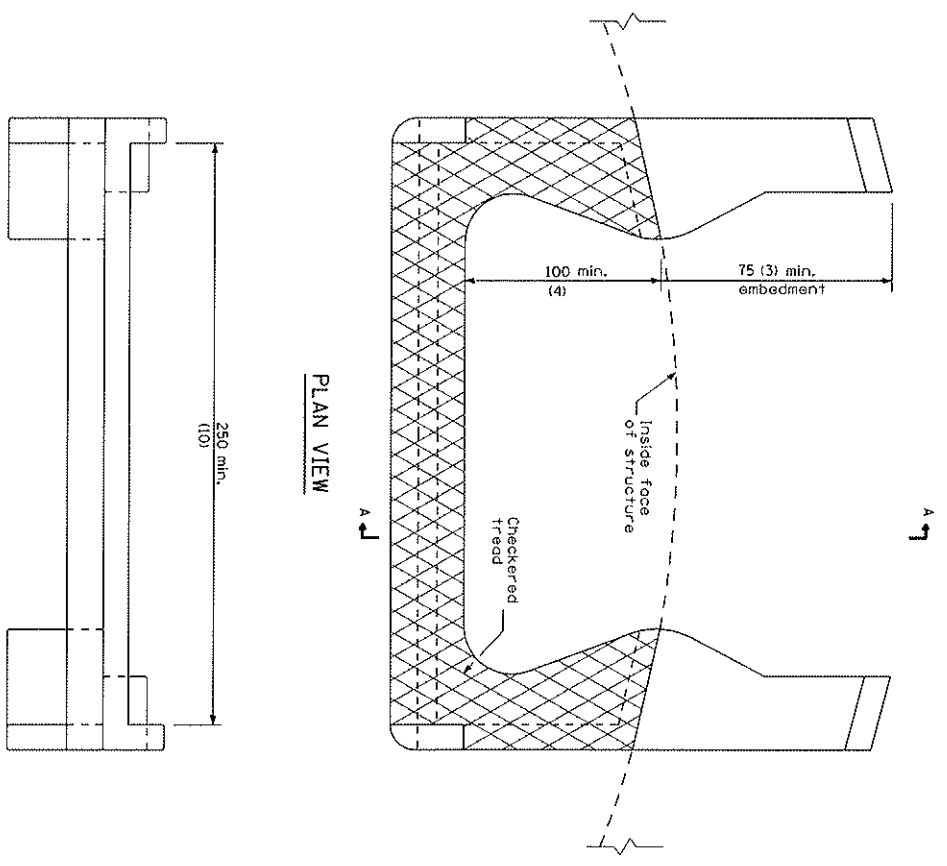
Illinois Department of Transportation
 Approved: [Signature] 2007
 Engineer: [Signature] 2007
 ISSUE 01-1-97

REVISIONS

DATE	REVISIONS
1-1-07	Soft converted metric reinforcement bars.
1-1-97	Renum. Standard 2354-2

PRECAST REINFORCED CONCRETE FLAT SLAB TOP STANDARD 602601-01

CAST IRON STEPS



PLAN VIEW

SECTION A-A

ELEVATION VIEW

Irradiation Department of Transportation	
Passed	April 1, 2008
Engineer of Safety and Procedures	<i>Scott S. Kelly</i>
Approved	April 1, 2008
Engineer of Design and Environment	<i>Michael J. Lee</i>
ISSUED	1-1-97

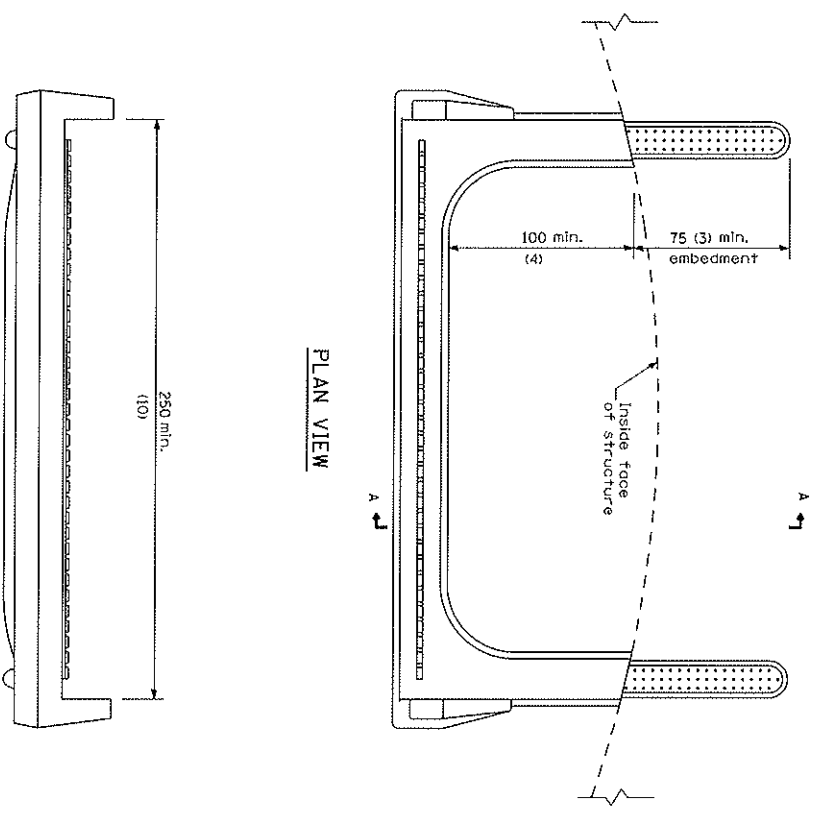
DATE	REVISIONS
4-1-06	Revised title, drawings, and added plastic steps on sheet 2.
1-1-97	Renum. Standard 244T.

All dimensions are in millimeters (inches) unless otherwise shown.

MANHOLE STEPS
(Sheet 1 of 2)

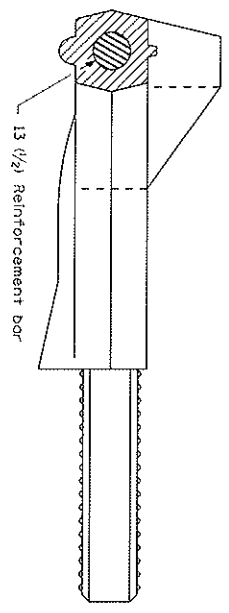
STANDARD 602701-01

PLASTIC STEPS



PLAN VIEW

ELEVATION VIEW



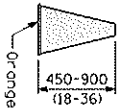
SECTION A-A

British Department of Transportation
PASSED April 1, 2006
ENGINEER *[Signature]*
APPROVED *[Signature]* April 1, 2006
DESIGNED BY *[Signature]*
DRAWN BY *[Signature]*

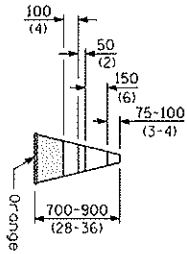
ISSUED 1-1-91

All dimensions are in millimeters (inches) unless otherwise shown.

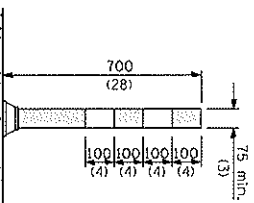
MANHOLE STEPS
STANDARD 602701-01 (Sheet 2 of 2)



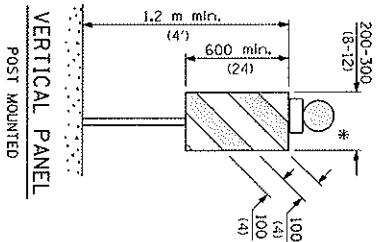
CONE



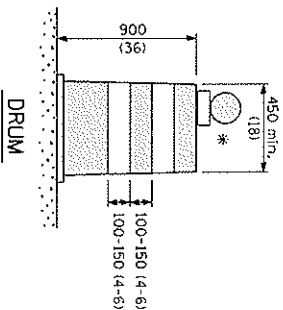
REFLECTORIZED CONE



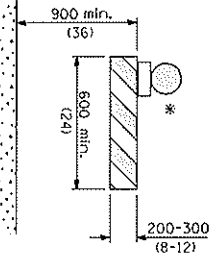
FLEXIBLE DELINEATOR



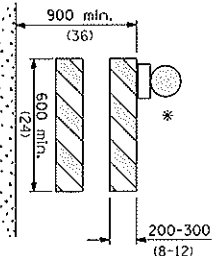
**VERTICAL PANEL
POST MOUNTED**



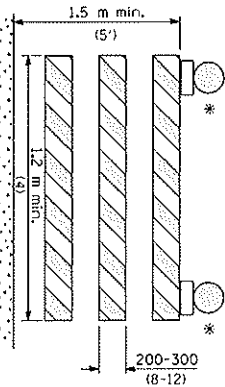
DRUM



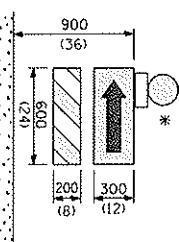
TYPE I BARRICADE



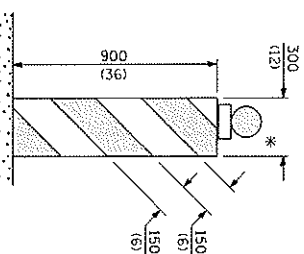
TYPE II BARRICADE



TYPE III BARRICADE



**DIRECTION INDICATOR
BARRICADE**



VERTICAL BARRICADE

* Warning lights (if required)

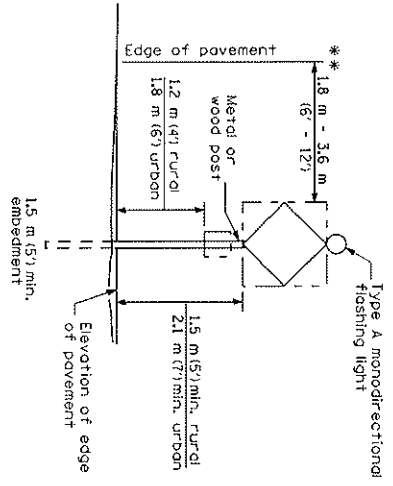
GENERAL NOTES
All heights shown shall be measured above the pavement surface.
All dimensions are in millimeters (inches) unless otherwise shown.

Illinois Department of Transportation	
APPROVED	DESIGNED
<i>[Signature]</i>	<i>[Signature]</i>
2008	2008
ENGINEER OPERATIONS	
APPROVED	DESIGNED
<i>[Signature]</i>	<i>[Signature]</i>
2008	2008
SCHEMATIC DESIGN AND ENVIRONMENT	
ISSUES	1-1-97

DATE	REVISIONS
1-1-08	Renumbered Standards
10/01-06	Rev. Note for Temp. signs on Sheet 2.
4-1-06	Revised vert. barricade, post mounted signs, and signs on temp. supports.

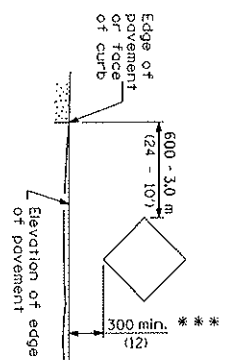
TRAFFIC CONTROL DEVICES
(Sheet 1 of 3)

STANDARD 701901



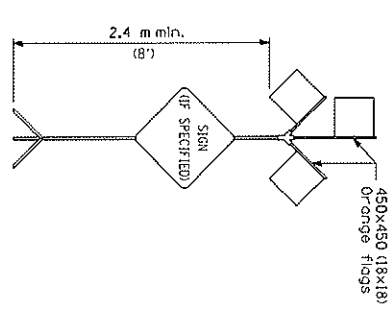
*** When curb or paved shoulder are present this dimension shall be 500 (24) to the edge of the paved shoulder.

POST MOUNTED SIGNS

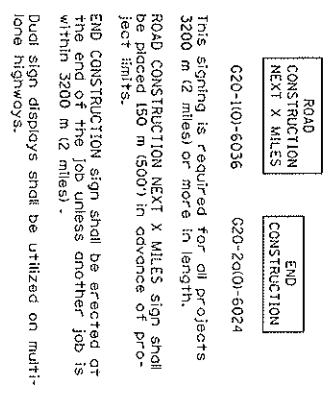


*** When work operations exceed four days, this dimension shall be 1.5 m (5.1) m. If located behind other devices, the height shall be sufficient to be seen by motorists.

SIGNS ON TEMPORARY SUPPORTS

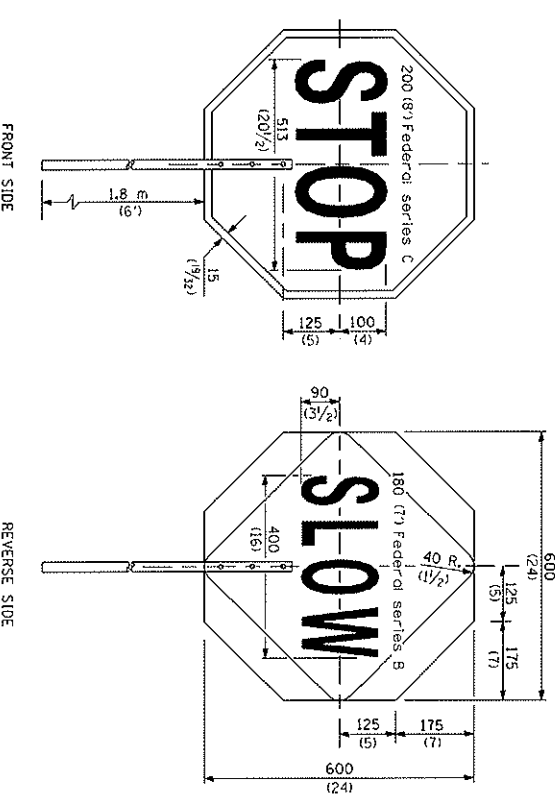


HIGH LEVEL WARNING DEVICE



This signing is required for all projects 3200 m (12 miles) or more in length. ROAD CONSTRUCTION NEXT X MILES sign shall be placed 150 m (500') in advance of project limits. END CONSTRUCTION sign shall be erected at the end of the job unless another job is within 3200 m (12 miles). Dual sign displays shall be utilized on multi-lane highways.

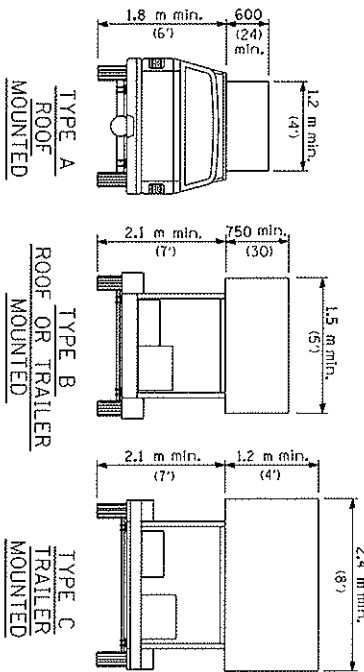
WORK LIMIT SIGNING



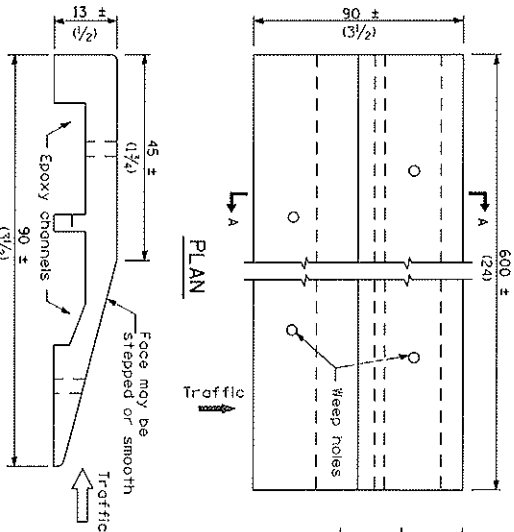
FLAGGER TRAFFIC CONTROL SIGN

TRAFFIC CONTROL DEVICES
 (Sheet 2 of 3)
STANDARD 701901

All dimensions are in millimeters (inches) unless otherwise shown.

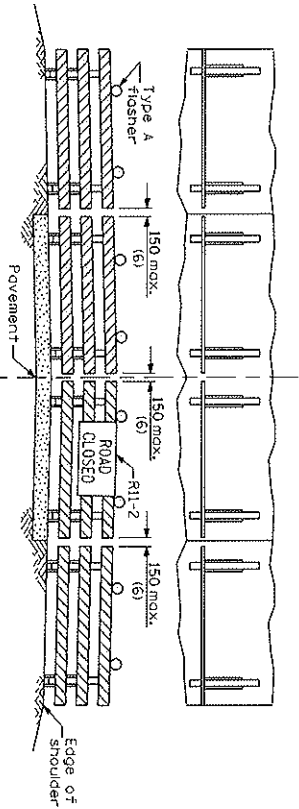
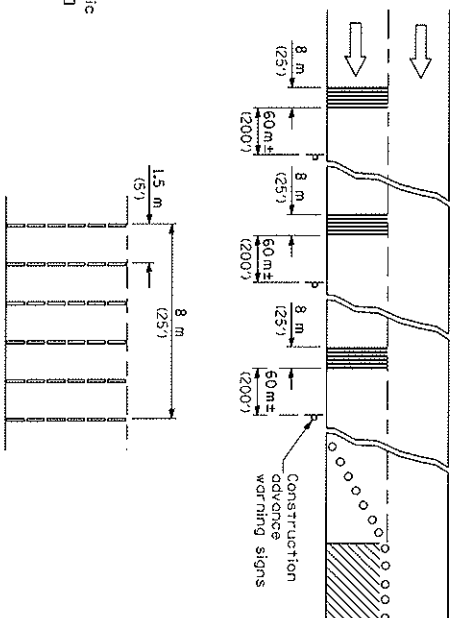


ARROW BOARDS



TEMPORARY RUMBLE STRIPS

TYPICAL INSTALLATION



ROAD CLOSED TO ALL TRAFFIC

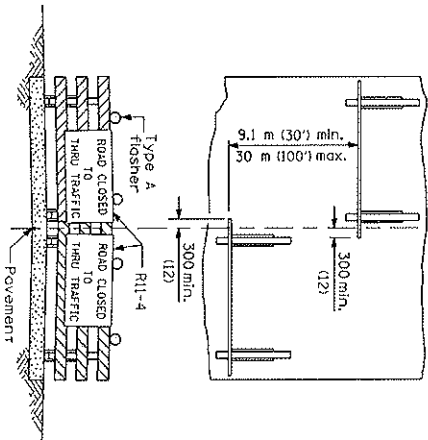
ReflectORIZED striping may be omitted on the back side of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the sign may be mounted on an NCHRP 350 temporary sign support directly in front of the barricade.

TYPICAL APPLICATIONS OF TYPE III BARRICADES CLOSING A ROAD

Illinois Department of Transportation
 APPROVED: [Signature] January 1, 2003
 ENGINEER OPERATIONS
 APPROVED: [Signature] January 1, 2003
 ENGINEER OF DESIGN AND ESTIMATION
 IJSS0500 1-1-94

ROAD CLOSED TO THRU TRAFFIC

ReflectORIZED striping shall appear on both sides of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the signs may be mounted on NCHRP 350 temporary sign supports directly in front of the barricade.



TRAFFIC CONTROL DEVICES

STANDARD 701901

(Sheet 3 of 3)

All dimensions are in millimeters (inches) unless otherwise shown.